

QST

DEVOTED EXCLUSIVELY TO

AMATEUR RADIO

Published by the American Radio Relay League

**In this issue—
Doing away with**

STATIC



MARCH
1925

25¢



*Selections
from
Carmen*

says the broadcasting announcer, and in a moment you are transported to old romantic Spain, to enticing, sunny Seville. That is but one of the endless joys of radio owning. For the full enjoyment of modern life, radio has become a necessity. For full enjoyment of radio, you will find Cunningham Tubes essential.

Since 1915—Standard for all sets
Types C-301A C-299 C-300 C-11
C-12

In the orange and blue carton
\$3.00 each



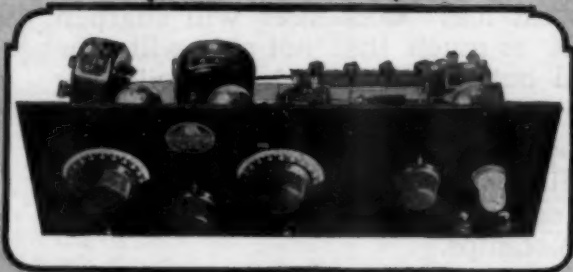
Cunningham
RADIO TUBES

Home Office:
182 Second Street
SAN FRANCISCO

E. J. Cunningham Inc.

CHICAGO
NEW YORK

Patent Notice: Cunningham tubes are covered by patents dated 2-18-08, 2-18-12, 12-30-13, 10-23-17, 10-23-17, and others issued and pending. Cunningham 40-page data book fully explaining care and operation of Radio Tubes now available by sending 10c in stamps to San Francisco Office.



Now You Can Afford — a modern precision-made set which "cuts through"

⌘ Tuned radio frequency for distance and selectivity, reflex for economy, the unequalled loudspeaker tone quality and volume which comes with ALL-AMERICAN precision manufacture—all are present in this non-radiating three-tube receiver. ⌘ And, owing to the economy of "wiring it yourself," ALL-AMAX SENIOR costs less than a finished one-tube set of equally high quality. Price \$42.

The RADIO KEY BOOK is a radio education in itself. Send ten cents, coin or stamps, for your copy.

ALL-AMERICAN RADIO CORP
PIONEERS IN THE INDUSTRY
2642 Coyne Street Chicago

ALL-AMERICAN

Largest Selling Transformers in the World

ALL-AMERICAN Guaranteed Radio Products

Standard Audio Transformers
3 to 1 Ratio, type R-12... \$4.50
5 to 1 Ratio, type R-21... 4.75
10 to 1 Ratio, type R-13... 4.75

Power Amplifying Transformers
(Push-Pull)
Input type R-30... \$6.00
Output type R-31... 6.00

Rauland-Lyric
A laboratory grade audio
transformer for music
lovers. R-500... \$9.00

Universal Coupler
Antenna coupler or tuned r. f.
transformer. R-140... \$4.00

Self-Tuned
R. F. Transformer
Wound to suit the
tube. R-199 \$5.00. R-201A \$5.00

Long Wave Transformer
(Intermediate Frequency)
(15-75 kc.) R-110... \$6.00

10,000 Meter (30 kc.)
Transformer
Tuned type (filter or
input). R-120... \$6.00

Radio Frequency Coupler
(Oscillator Coupler). R-130 \$5.00

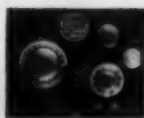
Super-Fine Parts
Consisting of three R-110's, one
R-120 and one R-130... \$26.00

The ALL-AMAX Sets

This shows how
they come to
you—mounted
complete on
panel and base-
board, with full
photographic
wiring instruc-
tions.



All-Amax Junior



A one-tube reflex set
that brings in the locals
on the loudspeaker, with
wonderfully clear tone
quality, or tunes them
out and gets real dis-
tance. Non-Radiating.
Price \$22.00

Improve your set with an **ACME** low loss condenser

IF YOU'VE got a good set, make it *better* with an Acme "lowest loss" Condenser.

To keep interference of all kinds out of your headphones or loudspeaker, you must have a sharp tuning system.

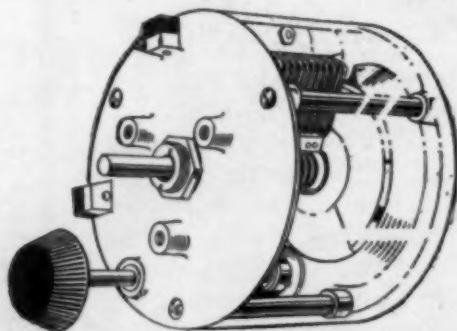
The Acme "lowest loss" Condenser will sharpen your tuning circuit so much that not only will your range be increased but your fun won't be spoiled by interference.

Write us for 36-page book "Amplification without Distortion," containing many diagrams and useful hints on making a set and getting the most out of it. Enclose 10 cents in stamps.

ACME APPARATUS COMPANY

Dept. E 2

Cambridge, Mass.



ACME low loss condenser
Price \$6.50

ACME

~for amplification

THE TRAFFIC DEPARTMENT, A.R.R.L.

Manager

A.D.M. D. of C.
A.D.M. Maryland
A.D.M. So. N. J.
A.D.M. West. N. Y.
A.D.M. East Penna.
A.D.M. West. Penna.
A.D.M. Delaware

Manager

A.D.M. Michigan
A.D.M. Ohio
A.D.M. Illinois
A.D.M. Wisconsin
A.D.M. Indiana
A.D.M. Kentucky

Manager

A.D.M. Minnesota
A.D.M. So. Dakota

Manager

A.D.M. Louisiana
A.D.M. Mississippi
A.D.M. Tennessee
A.D.M. Arkansas

Manager

A.D.M. New York City
A.D.M. No. New Jersey
A.D.M. East New York

Manager

A.D.M. Iowa
A.D.M. Missouri
A.D.M. Kansas
A.D.M. Nebraska

Manager

A.D.M. Rhode Island
A.D.M. New Hampshire
A.D.M. Vermont
A.D.M. Maine
A.D.M. West. Mass.
A.D.M. East. Mass.
A.D.M. Connecticut

Manager

A.D.M. Montana
A.D.M. Washington
A.D.M. Oregon
A.D.M. Alaska
A.D.M. Idaho

Manager

A.D.M. Arizona
A.D.M. Nevada
A.D.M. So. Calif.
A.D.M. Central Calif.
A.D.M. No. Calif.
A.D.M. Hawaii

Manager

A.D.M. West. Va.
A.D.M. Virginia
A.D.M. No. Carolina

Manager

A.D.M. Colorado
A.D.M. Utah

Manager

A.D.M. So. Carolina
A.D.M. Alabama
A.D.M. Florida
A.D.M. Georgia
A.D.M. Porto Rico

Manager

A. D. M. Oklahoma
A.D.M. So. Texas
A.D.M. No. Texas

Manager

A.D.M. P. E. I.
A.D.M. New Brunswick

Manager

A.D.M. Central Ont.

Manager

A.D.M. Saskatchewan
A.D.M. Manitoba

Manager

E. B. Duvall
A. B. Goodall
G. L. Deichmann, Jr.
H. W. Denham
C. S. Taylor
J. F. Rau
P. E. Wiggins
F. H. Layton

R. H. G. Mathews
C. E. Darr
C. E. Nichols
G. W. Bergman
C. N. Crapo
D. J. Angus
J. C. Anderson

D. G. Wallace
L. V. Berkner
M. J. Junkins

W. W. Rodgers
V. L. Rosso
W. L. Kennon
W. C. Hutcheson
Dr. L. M. Hunter

E. M. Glaser
F. H. Mardon
A. O. Wester, Jr.
G. Kastenmayer

P. H. Quinby
D. E. Watts
L. B. Lalsure
C. M. Lewis
H. A. Nielsen

I. Vermilya
D. B. Fancher
C. P. Sawyer
W. M. Hall
Dick Chase
T. F. Cushing
B. H. Chase
D. C. Comstock

Everett Kiek
H. E. Cutting
Everett Kiek
P. B. Hoppe
Geo. Sturley
K. S. Norquest

M. E. McCreery
H. L. Gooding
M. E. Smart
D. M. Brockway
P. W. Dann
Stanley Runyon
K. A. Cantin

W. T. Gravely
J. L. Beck
J. F. Wohlford
H. S. Morris

N. E. Hood
P. M. Segal
Art Johnson

H. L. Beld
A. DuFre
H. S. Brownell
C. F. Clark
J. M. Keith
Luis Rexach

F. M. Corlett
K. M. Ehret
E. A. Sahm
W. B. Forrest, Jr.

W. C. Borrett
W. Hyndman
T. B. Lacey

C. H. Langford
W. Y. Sloan

J. V. Argyle

J. E. Brickett
E. L. Maynard
F. E. Rutland, Jr.

A. J. Ober

ATLANTIC DIVISION

3719 Rhode Island Ave.
1824 Ingleside Ter.
Chapel Gate Lane, Ten Hill,
148 Washington St.
398 Masten St.
2985 E. Kingston St.
714 Johnston St.
895 Washington St.

Mt. Ranier, Md.
Washington
Baltimore
Collingswood, N. J.
Buffalo
Philadelphia
Wilkinsburg
Wilmington

CENTRAL DIVISION

1358 Estes Ave
137 Hill Ave., Highland Pk
739 Weadock Ave
Dwight
443 Newton Ave.
510 N. Illinois St.
Glengarry Farm

Chicago, Ill.
Detroit
Lima
Milwaukee
Indianapolis
Lexington

DAKOTA DIVISION

54 Penn. Ave. N.
Radio Bldg. Elec. Eng. Bldg.

Minneapolis
U. of M., Minneapolis
Bryant

DELTA DIVISION

1106 Union Ave.
Box 415
University Post Office
Dwight
207 1/2 Main St.

Memphis, Tenn.
Plaquemine
Mississippi
Wind Rock
Little Rock

HUDSON DIVISION

Brooklyn, N. Y.
1309 West Farms Rd.
1075 Chancellor St.
417 Paige St.

845 E. 13th St.
Bronx
Irrington
Schenectady

MIDWEST DIVISION

Box 134-A, Rt. 6
116 Highland Ave.
8020 Mercer St., R.F.D. No. 1
312 E. Rutledge St.
4708 No. 39th St.

Omaha, Nebr.
Clear Lake
Kansas City
Yates Center
Omaha

NEW ENGLAND DIVISION

86 Franklin St.
11 Stark St.
291 So. Union St.
78 College St.
39 Chester Ave.
1622 Main St.

Mattapoisett, Mass.
Westerly
Manchester
Burlington
West Baldwin
Springfield
Winthrop
E. Hartford

NORTHWESTERN DIVISION

3802 Hoyt Ave.
Box 517
2802 Hoyt Ave.
1633 Williamette St.
206 E. 17th St.
Weather Bureau

Everett, Washington
Bastman
Everett
Eugene
Vancouver, Wash.
Bellevue

PACIFIC DIVISION

7322 Male Ave.
Box 175
4909 Sunset Blvd.
962-35th St.
Box 99-A
1593 Pilihi St.

Los Angeles, Calif.
Douglas
Fallon
Hollywood
Oakland
Walnut Grove
Honolulu, T. H.

ROANOKE DIVISION

424 Main St., Box 245
Main St.
118 Cambridge Ave.
413 S. Broad St.

Danville, Va.
Farmington
Roanoke
Gastonia

ROCKY MOUNTAIN DIVISION

1022 S. Ash St.
404 Equitable Bldg.
247 E. 7th South St.

Casper, Wyo.
Denver, Colo.
Salt Lake City

SOUTHEASTERN DIVISION

11 Shadow Lawn Ave.
200 Wolford Campus
Box 2165,
e/o Western Union Tel. Co.
76 Clement Drive
Box 319

Atlanta, Ga.
Spartanburg
Birmingham
Jacksonville
Atlanta
San Juan

WEST GULF DIVISION

2515 Catherine St.
2904 N. Robinson
Box 569
502 Royal St.

Dallas, Texas
Oklahoma City
New Braunfels
Waxahatchie

MARITIME DIVISION

14 Sinclair St.
e/o N. B. Power Co.

Dartmouth, N. S.
Charlottetown
St. John

ONTARIO DIVISION

253 Cheapside St.
167 Close Ave.

London, Ont.
Toronto

QUEBEC DIVISION

493 Decarie Blvd

Montreal

WINNIPEG DIVISION

260 Athabaska St., E.
Box 339
452 St. John Ave.

Moose Jaw, Sask.
Morse
Winnipeg

VANCOUVER DIVISION

Cor. Main & Mhperva Sta.

Vulcan, Alberta

Yes, You Can Log, Sometimes

An expert, with a sharp eye, a strong light, and a perfectly steady hand may be able to tune to even a half a degree of accuracy, using ordinary dials.

But that's far too coarse!

Any modern, sharp-tuning set should be tuned to at least an eighth of a degree of accuracy. Yes! Tuned and logged!

That's what you can do with the Jewett Micro-Dial.

Here is a dial fifty times as accurate—a dial with which you can scientifically and thoroughly sweep the ether, without missing a single station your set can reach, and getting every one at its absolute maximum.

Best of all, you can install the Micro-Dial with only a screwdriver. Slip off the old, guessing type dials; slip on the new Micro-Dial equipment.

Get your Micro-Dials today and set a string of new records for your set tonight!

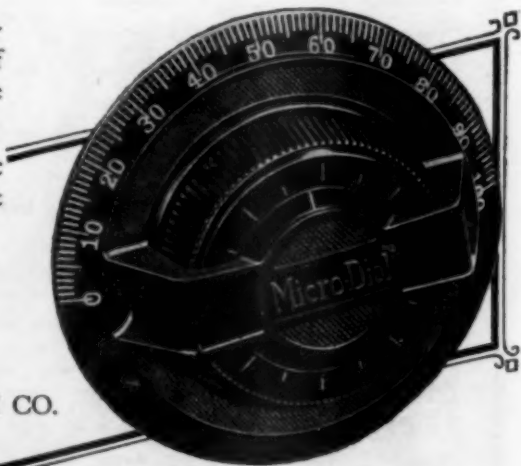
If your dealer cannot supply you, we will ship direct to you, charges prepaid on receipt of list price, \$3.50.

JEWETT RADIO & PHONOGRAPH CO.
5674 Twelfth Street, Detroit, Mich.



EXCLUSIVE!

Mounts where any four-inch dial will mount—Absolutely self-contained—Nothing to be attached to panel—Slight eccentricity or angularity of instrument shaft of no consequence; Micro-Dial will not bind—Absolutely noiseless—Knob mounted on double cone bearing, self-adjusting and self-aligning—No metal to tarnish or cause body effects—no rubber to deteriorate—Micrometer and coarse adjustments turn complete circle—Calibration clockwise or anti-clockwise as desired—Mechanism lubricated for life—Lasts forever—Improves with use.



Micro-Dial

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS



QST



The Official Organ of the A.R.R.L.

VOLUME IX

MARCH, 1925

NUMBER 3

Editorials	7
Margaret M. King	8
"QRR" Re: Railroad Emergency	8
Hudson Division Hams Attention	8
Daylight Radio Communication Wins	9
Official Wavelength Stations	17
The McCaa Anti-Static Devices (Part II)	18
Tri-State Convention—Pittsburgh, Pa.	23
Raising the Ante	23
The New Magnavox Tube	24
All Aboard for Paris	26
A Handy Wavemeter Trick	28
New Regulations for Transmitting Stations	29
Notes on Reflexing Receivers	30
WWV and 6XBM Schedules	34
New England Division Convention	34
6TS and 2MU First Across on 40 Meters	35
Coming—A.R.R.L. National Convention	35
The Deresnadyne	36
Regarding NKF	39
A Good Wavemeter	40
A Tuned Audio Transformer	43
Pacific Division Cops Two Trophies	44
Learning the Code by Listening	45
Rules Governing the A.R.R.L. Information Service	47
A Neat Tuner Unit	47
Circumventing the Locals	48
Florida Convention	49
Experimenters Section Report	50
The Uncle Sam Tuner	52
Amateur Radio Stations 6DD, 9BMX, 9SZ	53
The Canadian Section	55
Calls Heard	57
Communications	60
HAM-ADS	103
QST's Directory of Advertisers	111

Herbert E. Metcalf

A. L. Budlong

E. F. Andrews and E. A. Beane

John M. Clayton and L. W. Hatry

Philip G. Schermarkhorn

QST is published monthly by The American Radio Relay League, Inc., at Hartford, Conn.

S. Kruse,
Technical Editor

L. W. Hatry,
Department Editor

Kenneth B. Warner (Secretary, A.R.R.L.),
Editor and Business Manager

F. C. Beekley,
Assistant Editor

Edwin C. Adams,
Advertising Manager

David H. Houghton,
Circulation Manager

Subscription rate in United States and Possessions, Canada, and all countries in the American Postal Union, \$2.00 per year, postpaid. Single copies, 25 cents. Foreign countries not in American Postal Union, \$2.50 per year, postpaid. Remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized September 8, 1922. Additional entry as second-class matter, acceptable at special rate of postage provided for above, at Springfield, Mass., authorized September 17, 1924.

Copyright, 1925, by the American Radio Relay League, Inc., Title registered at United States Patent Office.

THE AMERICAN RADIO RELAY LEAGUE

The American Radio Relay League, Inc., is a national non-commercial association of radio amateurs, bonded for the more effective relaying of friendly messages between their stations, for legislative protection, for orderly operating, and for the practical improvement of short-wave two-way radio telegraphic communication.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is non-commercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its Board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in America and has a history of glorious achievement as the standard bearer in amateur affairs.

Inquiries regarding membership are solicited. Ownership of a transmitting station, while very desirable, is not a prerequisite to membership; a bona-fide interest in amateur radio is the only essential. Correspondence should be addressed to the Secretary.

OFFICERS

President
HIRAM PERCY MAXIM
Hartford, Conn.

Vice-President
CHAS. H. STEWART
St. David's, Pa.

Traffic Manager
F. H. SCHNELL
1045 Main St.
Hartford, Conn.

Canadian Gen. Manager
A. H. K. RUSSELL
6 Mail Bldg.,
Toronto, Ont.

Treasurer
A. A. HEBERT
Hartford, Conn.

Secretary
K. B. WARNER
Hartford, Conn.

DIRECTORS

President
HIRAM PERCY MAXIM
Drawer 4,
Hartford, Conn.

Vice-President
CHAS. H. STEWART
St. David's Pa.

Canada
A. H. K. RUSSELL
6 Mail Bldg.,
Toronto, Ont.

Atlantic Division
GEO. L. BIDWELL
1245 Evars St., N. E.,
Washington, D. C.

Central Division
CLYDE E. DARR
187 Hill Ave., Highland Park,
Detroit, Mich.

Dakota Division
C. M. JANSKY, JR.
Dept. of Elec. Eng., U. of M.,
Minneapolis, Minn.

Delta Division
BENJ. F. PAINTER
424 Hamilton Nat'l Bank Bldg.,
Chattanooga, Tenn.

Hudson Division
DR. LAWRENCE J. DUNN
480 East 19th St.,
Brooklyn, N. Y.

Midwest Division
L. BOYD LAIZURE
80th & Mercier Sts., R. F. D. 1,
Kansas City, Mo.

New England Division
DR. ELLIOT A. WHITE
Apt. K, The Parker, N. Park St.,
Hanover, N. H.

Northwestern Division
K. W. WEINGARTEN
2219 No. 24th St.,
Tacoma, Wash.

Pacific Division
ALLEN H. BABCOCK
65 Market St.,
San Francisco

Roanoke Division
W. TREDWAY GRAVELY
503 Main St.,
Danville, Va.

Rocky Mountain Division
PAUL M. SEGAL
404 Equitable Bldg.,
Denver, Colo.

Southeastern Division
HARRY P. DOBBS
c/o Dobbs & Wey Co.,
Atlanta, Ga.

West Gulf Division
FRANK M. CORLETT
2515 Catherine St.,
Dallas, Tex.

Address General Correspondence to Executive Headquarters, Hartford, Conn.

EDITORIALS

Avoiding Trouble

THE regulations of the Department of Commerce state that amateur transmitting stations operating on waves below 85.6 meters need not observe the quiet hours that are specified for longer amateur waves "provided they do not interfere with other services." Conversely, when they do materially interfere with other services and it isn't the fault of the other services, they can expect to be closed down during quiet hours.

"Other services" of course means the listener to broadcasts, almost every time. It is a peculiarly difficult problem because we amateur transmitters and the B.C.L.'s live in the same block. We do not want to break up the reception of programs; they do not want to stop us in our useful work; both groups have their "rights", but neither to the exclusion of the other. Only a considerable measure of real co-operation can make the community situation wholly satisfactory. This co-operation must come from both parties. An amateur should not figure that the bare possession of a federal license to transmit is open authority to operate even if all broadcast reception in his locality is demoralized; nor should the concert-listener get the idea that radio was made for him and that all amateurs are nuisances of a very low order who should be ruled off the air to protect his own operation. Somewhere in between these extreme views lies a reasonable one which should govern. Radio isn't perfect yet; all services are frightfully congested; interference of some sort is the rule rather than the exception. Congress hasn't yet done the obviously desirable thing and given the Inspection Service funds enough to enable them to increase their personnel and get actively out in the field and help. Co-operation between the various classes of radio users is the only solution.

The practice of the Department of Commerce in the cases of reported amateur interference between 8:30 and 10 p.m. is a fair and reasonable one. They investigate as soon as they can. If the amateur transmitter is creating wholesale interference, if it can't be adjusted to prevent breaking up reception on decent B.C.L. tuners, it is closed down during quiet hours, regardless of its wavelength or other character-

istics. Some dozens of amateur stations have thus been ordered to observe quiet hours on all waves. On the other hand, if the transmitter is able to operate without bothering ordinarily good broadcast receivers, the remaining listeners who insist upon using antennas upwards of 150 feet in length or ancient single-circuit tuners of obsolete design, neither deserve nor get any sympathy from the Supervisors. Trouble of this nature is so easy to correct that no B.C.L. is entitled under these circumstances to claim that "other services" are being interfered with and that the hams should be piped down—he hasn't done his part yet.

We transmitting amateurs should start the co-operation that is necessary in these days of congested operation. Housecleaning, like charity, begins at home. It is possible to build a short-wave transmitter that won't interfere with anything except the rankest designs of phone receivers. The regulations require the use of loose coupling and a plate supply that is either D. C. or else full-wave rectified, either self-rectifying in the tubes or by means of a separate rectifier. Is your coupling loose? We have published all the dope we could lay our hands on, on filters and rectifiers, on methods of eliminating the keying impact, on good loose-coupled circuits. If you apply this knowledge to your station, it will solve your troubles. Are you using it? How about reducing power during the popular evening hours? That alone will go a long ways towards eliminating interference.

We think that every good ham these days ought to investigate conditions in his neighborhood and make it his business, first, to bring his transmitter to the best possible stage, and then to help the individual listeners who still have trouble. And we think these listeners ought to welcome this co-operation and participate. It is easy for the transmitting amateur to spot the too-long aerial; easy to convert the single-circuit atrocity into a real tuner by adding an untuned antenna coil and connecting the tuning condenser across the secondary. And a simply-made wave trap, connected across the input of the tuner to act as a rejector will generally cure the worst cases without modifying the receiver—just an ordinary condenser and a few feet of wire! A little contact work among the few hard cases of interference,

after the transmitter itself is modernized, will make the amateur the most popular man in the neighborhood, will create a splendid public appreciation of amateur radio, and will prevent the possibility of a

shut-down order during the early evening hours. It's a job that every transmitting amateur ought to undertake for his own sake.

—Kenneth Bryant Warner



Margaret Mary King

With deepest sorrow QST chronicles the untimely death of Miss Margaret M. King, the assistant treasurer and chief accountant of the A.R.R.L., which occurred on January 25th following an operation for appendicitis.

"Peg" was well known to many members of our League, winning friends wherever she went. She was a member of our official family for nearly five years, only the secretary and the advertising manager exceeding her term of service on the headquarters staff. In time someone else will take her place on our staff, but never in our hearts. She was the sunshine of our office, a loyal, versatile and trusted co-worker, a friend beloved by all. She grew up with us from a high-school girl to a charming young woman; we cannot believe that she is gone.

The "Jaques Cartier", French cargo carrier and training ship, is testing with Eiffel Tower on 115 meters. Eiffel Tower has been able to receive the ship successfully when it was in port at San Francisco.

"QRR" Re: Railroad Emergency

RAILROAD emergency work is rapidly assuming a prominent position in the traffic work of the League. The Principal activity so far has been confined to the Rocky Mountain Division, to the Pennsylvania Railroad and to the New York Central System. Emergency work has at times been performed on other systems, and the time has come when a standard emergency sine is a necessity.

It has been decided that we will create a new "Q" signal, "QRR".

Whenever a railroad calls on you for assistance, this signal will indicate to all stations hearing you that you have emergency traffic to clear. At the same time you should insert "east", "north", "west", etc., to indicate the direction you wish to clear. The name of the city you wish to clear may be inserted instead, if desired. A sample emergency call would run something like this: "QRR QRR QRR QRR east east QRR east u 9XYZ 9XYZ 9XYZ." Or it might be "QRR QRR QRR Pittsburgh QRR Pittsburgh u 9XYZ 9XYZ, etc."

Emergency traffic will have precedence over all other forms of traffic. If you are located at, near or in line with the point it is desired to send the mags, do everything you can to get in communication with the calling station, but if you hear that station hook up with somebody else, *shut down and stand by*. Other stations not located in the desired direction shall shut down and stand by.

"QRR" is, from now on, the League's "land SOS." Use it only when an actual emergency exists. Do NOT use it for tests.

—A. L. B.

Hudson Division Hams Attention!

ALL set for the big doings? March 4th to 7th will open the biggest and best Second District Convention yet. From the opening to the big Ham banquet on the 7th the Hudson Division will have four days in "Ham's Paradise" in the Pennsylvania Hotel.

Last call for reservations. Send your \$5.00 admitting you to banquet, stunts, contests, etc. except R.O.W.H., to Executive Radio Council, Second District, 136 Liberty St., New York City.

Daylight Radio Communication Wins!

20-Meter Daylight Work Surpasses Results with Longer Waves at Night

WE KNEW it was going to happen—now we have brilliant proof that 20 meters is one of the most useful waves we have. Reliable transcontinental daylight communication is being carried on *at will* between 1XAM at S. Manchester, Conn., and 6TS at Santa Monica, California.

It is being done with less than a kilowatt at each end and the sureness of contact is better than anything we have ever seen before over such distances with any power less than 20 or 30 kilowatts.

The most beautiful thing of all is this—it isn't an accident, it isn't a freak, it is engineering, and John L. Reinartz *knew* that 6TS would answer before he ever made the first attempt at noonday communication.

The Story

In our February issue we reported the 20 meter tests of the Experimenters Section and told how, in these tests, 1XAM and 9EK had worked together in broad daylight and been copied at Berkeley, California. Those tests were not blind accidents but were based on experimental work that had been going on for over a year. Many of us were absolutely *sure* that extremely long-distance 20-meter daylight work was possible, and we were also sure that 20-meter night-time work was good for nothing. Therefore the tests were planned to show both of these things—and they did.

Right on the heels of this 1XAM worked 4XE in broad daylight at 1200 miles. This is so important a happening that it must be recorded in detail.

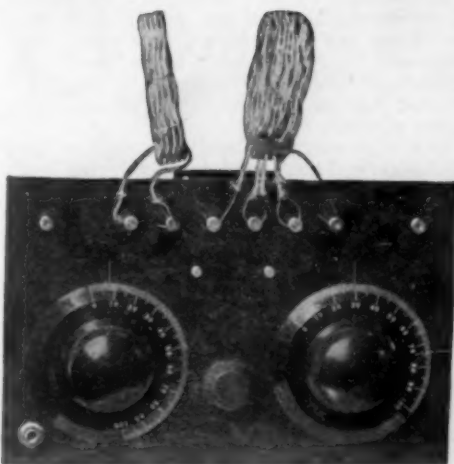
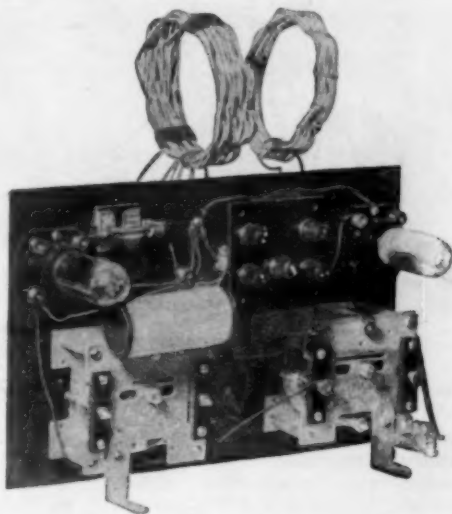
The 4XE-1XAM Record

Under the leadership of Reinartz of 1XAM, much short-wave pioneer work has been done by a group of stations in which 4XE is prominent. The two stations, 1200 miles apart, had planned to work together on Sunday by daylight. At 10.20 A. M. Sunday, Jan. 11th, William Justice Lee, of 4XE, heard 1XAM testing at 20.5 meters, the signals being very strong. At 10.33 1XAM called 4XE and contact was *immediately* established, with 4XE working at 42.5 meters until 11.23 when that station shifted to 18.3 meters and maintained excellent two-way communication until 12.03 P. M. at which time they stopped voluntarily. This also was no freak—the two stations had been making one-way tests for quite a while.

In passing it is pleasant to note that 4XE heard both 8XC (Erie, Pa.) and 9AXX (St. Paul, Minn.) while working with 1XAM.

The Transcontinental Record

For a long time 1XAM has been sending tests with a group of sending sets operated



THE RECEIVING SET AT 1XAM

by an Omnigraph. These sets were tuned to a variety of waves near 20 and 40 meters and with them information as to ranges

was gradually obtained. The nature of the theory worked out will be told in a later issue of *QST* but for the present it is

absolutely sure that the thing could be done at noon with a 20-meter set using less than a kilowatt of power.

They arranged to try it at 11.30 A. M., C. S. T. on January 22nd.

The Test Succeeds

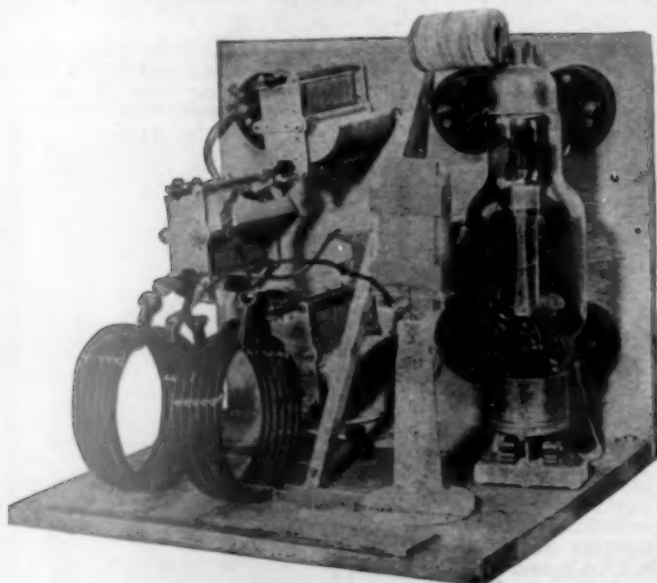
At 11.30 of the 22nd Reinartz held down the key until his tube was at a steady temperature, then he called 6TS *three* times, signed *three* times and said "K".

6TS replied at once!!

Daylight amateur trans-continental communication was a fact.

Reliability

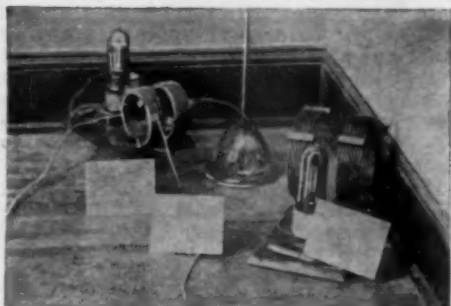
There was nothing spotty about the communication, no need to repeat words, no swinging or fading and when they stopped at 11.55 C. S. T. it was to enable Reinartz to get back to the Cheney Silk Mills in



THE MAIN 20 METER SET AT 1XAM

enough to say that this theory made it possible to prophecy that 20 meters was a wavelength excellently suited to work across the continent by daylight. It was also possible to prophecy that 40 meters *might* do the same thing and that the two would not act the same at sunset and sunrise—and it was possible to tell what the difference would be. Therefore the final success was no accident but a carefully prepared success.

For a number of days prior to the 22nd of January, 1XAM had been working with 6TS at Santa Monica, California, in the

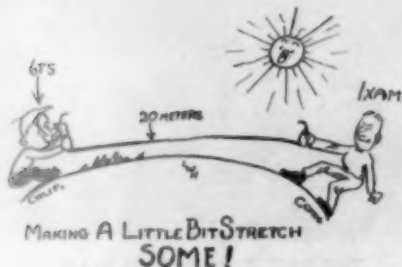


20 AND 40 METER SEMI-PORTABLE SETS AT 1XAM

The set at the left operates at waves near 20 meters, the one at the right operates at waves near 40 meters, both using the circuit shown in February *QST*.

The set at the left uses a 7 foot vertical copper pipe as antenna, while the c.p. is a wire laid on the floor toward the reader. The cable coming forward to the left is the 3-wire power line which supplies both filament and plate.

The 40 meter set uses a single-wire counterpoise, but the antenna is a single-wire inverted L instead of a straight tube. The L is about 7 feet high and the top about 3 feet long.



evening. The hours were from 5 to 8 C. S. T. and the waves used were mainly 40 and 20 meters.

The tests had made Reinartz and Willis

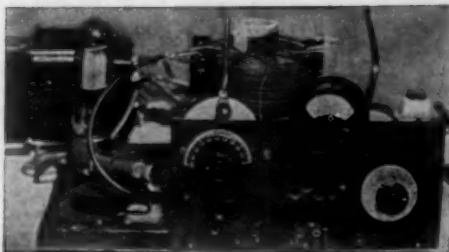
time for his afternoon's work on the new substation. Meanwhile a message had been handled which read as follows:

MSG NO. 22, SOUTH MANCHESTER, CONN.,
JAN. 22, 12.38 P.M.
TO SUPERVISOR OF RADIO OF THE
6TH RDO. DISTRICT.
SAN FRANCISCO, CALIFORNIA.

GREETINGS OF THE EAST TO THE WEST VIA
AMATEUR RADIO AND 6TS ON 21 METERS AT
NOON E.S.T.

(SIGNED) 1XAM.

Since that time the contact has been perfectly reliable. 1XAM and 4XE work at will, 4XE and 8XC work at will and all three of them work 6TS whenever there is a schedule. Since the most schedules have



THE 50-WATT SERIES-HARTLEY TRANSMITTER
AT 4XE, ORLANDO, FLA.

This is the set that made the 1200 mile record.
This set operates at 29 and 40 meters.



CLOSEUP OF ONE OF THE 4 SEMI-PORTABLE
SETS

This particular set has worked 9AXX at St. Paul, Minnesota, at 17 meters and at noon (E. S. T.) while the entire rig was in a room on the second floor of Mr. Reinartz's home. Good signal strength was reported. The distance is about 1000 miles.

been run between 6TS and 1XAM it is interesting to note that for 14 consecutive days these stations have been in two-way communication, either by daylight or at sunset, missing only one day—and that was because 6TS had dismantled his set to get it photographed for QST. Proof of this is furnished by a message just received at the last minute by 1CKP which station worked 6TS on 21 meters from 3.20 P. M. to 4.26 P. M. E. S. T. on Feb. 1.

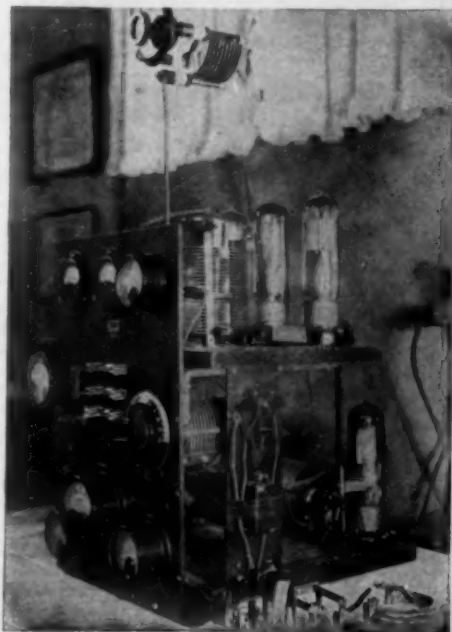
6TS, FEB. 1, 12.30 P.M. P.S.T.

TO S. KRUSE.

IN DAYLIGHT HAVE WORKED ON 21 METERS
1XAM 3 TIMES, 1CKP ONCE, 8XC ONCE. THERE
IS NO FREAK ABOUT THIS. BEST REGARDS.

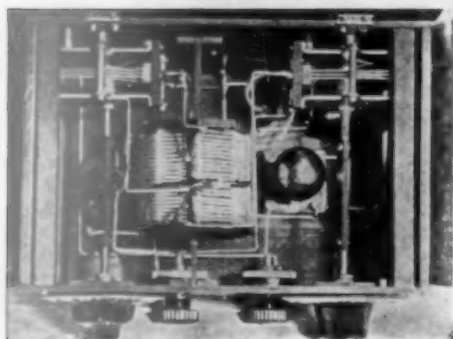
WILLIS, 6TS.

Perhaps the reader will wonder why we say that 1XAM-6TS have worked 13 times



Just to show that there's nothing one-sided about
4XE, here's the 80 meter transmitter, a master
oscillator rig whose voice is known in 5 continents.

when the message from 6TS says three. The answer lies in the fact that 6TS claims daylight work only for work done at NOON. In addition to this the two stations (1XAM and 6TS) have worked together at 40 meters for the 13 evenings mentioned. They shift from 40 to 20 and back again in a manner which will be understood when the



THE HARTLEY-TYPE RECEIVER AT 4XE

short-wave theory is explained. This cannot be done at this time because that story belongs to Radio News, which organization has made Reinartz a very fine offer for it and has also agreed to let us print it.

For the present we must content ourselves with reprinting from the Manchester (Conn.) Herald the following account by Reinartz.

Radio and the Eclipse

By John L. Reinartz

"For a long time it has been known that radio waves could be reflected, just as light rays are reflected with the aid of a polished surface. In the case of radio the reflector can take the shape of a large screen bent in the shape of a half circle and of dimensions comparable to the size of the radiating system used by a short wave transmitter. Such reflection is man-made but there is a reflection of a different order which is en-

tirely under the control of the sun and this type of reflection has only recently come to the attention of those who for the past year have been actively engaged in experimentation on radio waves of a length from 1 to 50 meters. It has been the writer's good fortune to be one of these, and he has been especially fortunate in that the work accomplished was of such value as to lead the Naval Research Laboratory at Bellevue, Washington, D. C., under the guidance of Dr. A. H. Taylor, to make proposals which led to active co-operation between them and the writer. This co-operation has extended over a period of a year and is not yet terminated.

"One of the problems of the past year has been the attempt to prove definitely the sun's control over short radio waves. It was generally known that the longer radio waves would travel a greater distance at night than during the daytime but it was not known that very short waves would travel further during the daytime than they would at night. The discovery that this was true was of course most important, but even more important was the other discovery that there is a definite relationship be-

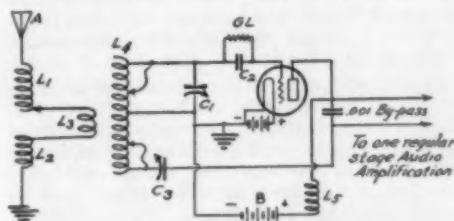


JOHN L. REINARTZ, 1XAM, WHO LED THE TESTS

tween the sun's effect, the distance and the shortness of the radio wave.

"The sun's part in all this is due to its capability to ionize the atmosphere of the air. The ionization depth varies with the position of the sun. It is this depth of

ionization which determines the manner in which short radio waves will be reflected. As the radio wave is shortened its penetra-



CIRCUIT OF THE TUNER AT 4XE—
Range 9 to 23 meters

- A—Single wire antenna 125 feet long.
- L1—Loading coil to kill dead spots, 25 turns No. 10 wire.
- L2—Loading coil with 30 turns No. 18 wire.
- L3—Primary coil, $2\frac{1}{2}$ turns No. 18 placed $1/16"$ from secondary.
- L4—Secondary coil, 23 turns No. 18 D.C.C. wire wound on octagonal frame $4"$ in diameter. Frame made of thin wooden strips. Clips are used to short out unused part of coil.
- L5—R.F. choke, 150 turns No. 28 on a $1"$ tube.
- C1—Cardwell variable condenser, originally had more plates but cut down to 7.
- C2—Grid condenser, 250 micro-microfarads (.00025).
- C3—Cardwell variable condenser cut down to 5 plates. Condenser shafts have 5 inch bakelite extensions to the dial.

Using 6 live turns in the plate and 3 live turns on the grid the tuning range is 9-36 meters. Using 6 live turns in the grid and 6 in the plate the tuning range is 23-60 meters. With the whole coil in circuit the range is up to 93 meters.

The tuner was built to specifications of Mr. Lee by 4TI of Jacksonville.

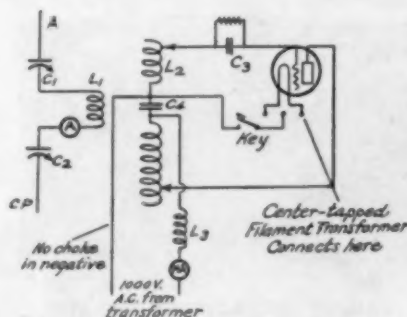
Signals from 1XAM are very strong at noon. During the eclipse 6TS was heard comfortably at 40 meters.

tion into the ionization layer is increased and for the same time of day a different distance can be covered by the use of a longer or shorter radio wave. The fact that the shorter wave penetrates the ionization layer to a greater height causes the reflection to take place at a higher altitude than would be the case for a longer, therefore the diameter of the circle at which the short wave again appears on the earth's surface is larger. Inside of this circle there is no evidence of the radio wave until one gets very close to the transmitting station. The reason for this is that the waves which travel along the world earth's surface have been subjected to all the absorbing influences which that surface carries, while those which went up to the ionized layer and were reflected back have traveled through a space and very little energy has been lost. This makes it possible to cover tremendous distances with but a fraction of the energy needed for some of the longer waves.

"It is possible to use this information in such a way as to obtain reliable daylight ranges considerably in excess of reliable

night-time range which can be obtained with the same power.

"Proof of this has been obtained by hundreds of transmission schedules the last eight months. The work was done with stations NKF, 4XE, 8XC, 9AXX, 9EK, 6TS and a number of receiving stations, particularly that of Mr. H. T. Dalrymple at Akron, Ohio. Before the 20-meter test of the Experimenters Section it was known that it would be possible for stations over 500 miles from each other to communicate but that stations inside that distance would probably not hear each other. Proof of this was obtained during the tests by the fact that 9EK at Madison, Wisconsin, and 9AXX at St. Paul, Minnesota, were not able to hear each other but could both communicate with 1XAM at South Manchester, Connecticut.



CIRCUIT OF THE 20 AND 40 METER
TRANSMITTER AT 4XE

- A—Antenna, single No. 12 solid copper wire 40' long.
- C.P.—Single No. 14 solid copper wire 37' long, 8' above ground.
- C2—Double spaced Coto-coil condenser—originally 500 micro-microfarad but now 125 micro-microfarads.
- C1—Double spaced Coto-coil condenser, originally 250 micro-microfarads, now 62.
- L1—Antenna coil, 9 turns No. 15 bell wire on 2" tube.
- L2—Split ribbon helix, 4 turns on grid side and 18 turns on plate side.
- L3—R.F. choke, 40 turns No. 26 wire on 2" pickle bottle.
- C3 & 4—Mica condensers, .002 microfarads, rated at 6,000 volts.

When operating at 41 meters 3 grid turns and 6 plate turns are used with the antenna operating on its fundamental wave. 16 dead turns are left on the plate side and have been found to stabilize operation.

When operating at 18.3 the variable condensers, C1 and C2, are set at minimum, the grid turns are reduced to 2 and the plate turns to 4.

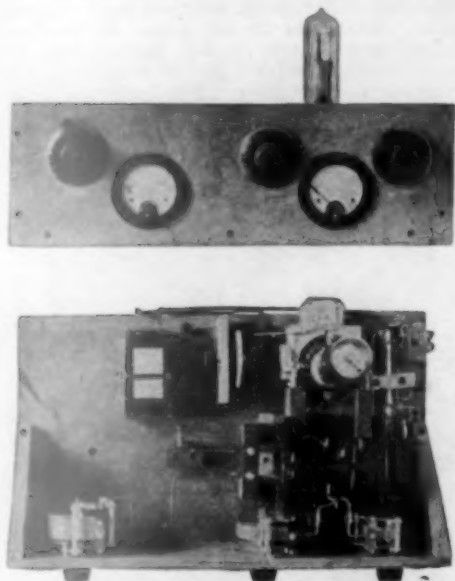
The coupling is fairly loose, the coils are spaced $1\frac{1}{2}$ to $2\frac{1}{2}$ inches, depending on the load that is wanted on the plate.

With the UV-203A tube shown the antenna current is 2 amperes at 40 meters and .9 ampere at 18.3 meters.

Much of this conversation was also copied by 6AJF at Berkeley, California.

"Additional proof was obtained during our recent eclipse of the sun. When the

sun's rays were shut off by the moon, ionization of our atmosphere did not extend down to the earth's surface as nearly as it did when the sun was shining, therefore the reflection of the short radio waves took place much higher in space and the distance at



THE FAMOUS DRY-BATTERY-OPERATED SET
AT 9EK, Burgess Battery Co., Madison, Wisconsin

This set has done such beautiful work for the power used that a complete description is appended. This description, the pictures of 4XE and the pictures of 6TS were all requested by 20 meter daylight radio. At this writing we fear that the pictures of 6TS will come too late—the airplane mail is delayed by snowstorms.

which they were reflected back to the earth was much greater in diameter. The short radio waves could not be received within that circle during this time. This was proven by the observer at the Naval Research Laboratory, Bellevue, Washington, D. C., who lost the 40 meter signals of 1XAM as the sun was being blotted out and who found them again when conditions had become normal once more. The same thing happened at 1XAM where 54.7 meter signals were being received from NKF. At the same time receiving stations who could not find these short wave signals before the eclipse began to hear them as the eclipse was coming into totality and lost them again shortly thereafter. This proved that the reflection occurred at higher altitude during totality and added to the conclusive evidence that the sun has a very great effect on radio, most especially on the short waves below 50 meters."

What Does It Mean

What does all of this mean to radio—and in particular to amateur radio?

First of all it may mean that our entire scheme of things will be upset and that long-distance stations will reduce both wavelength and power in daylight.

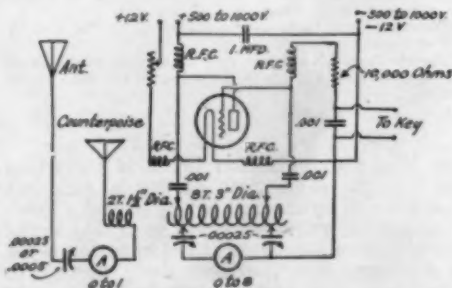
Secondly it will most certainly mean that there will be attempts on the part of commercial organizations to acquire the use of the wavelengths between 15 and 50 meters—and perhaps to attempt claims that the pioneering has been done by them, just as was the case of 100 meters.

How these things will come out we cannot say—but we are surer than ever that amateur radio is worthwhile, and we are surer than ever that the 5 meter band (like the 20, 40, 80, 100, 150 and 200 meter bands) will first be explored by non-commercial citizen radio men.

Let us not camp at 20 meters as so many did at 80—forward! Next month we will have an article on all sorts of 5 meter sets—that work.

The Circuits Used

Before turning to any apparatus descriptions it will be a good idea to think of one thing particularly—this has NOT been done



THE CIRCUIT OF THE 20-METER SET AT 9EK

Tube—UV-203-A.
Filament R.F.C.—35 turns 18 D.C.C. wound on 8 pegs in 1 1/4" dia. circle.
Grid and Plate R.F.C.—40 turns 28 D.C.C. wound on 8 pegs in 1 1/4" dia. circle.
Primary Tuning Condensers—Cardwell .00025 qfd receiving condensers.
Antenna Series Cond.—Cardwell .0005 qfd.
Antenna Coil—No. 8 bare wire.
Plate, Grid and Keying Condensers—.001 qfd mica Faradon UC-1805.
Filament Rheostat—Remler 3-amp. 15-ohm.
Antenna Meter—Jewell 0-1 amp. R.F. ammeter.
Closed Circuit Meter—Jewell 0-5 amp. R.F. ammeter.
Bi-Pass Condenser—UC-490 1 qfd paper condenser.

by any tricky "new circuit"—it is done with the intelligent use of the straightforward circuits that have been available continually. Therefore we can't possibly claim that luck had anything to do with it—nobody blun-

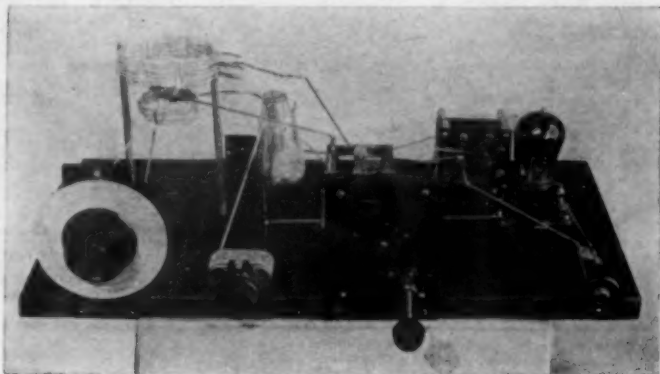
dered onto a circuit that happened to do it—nothing of the sort. In the stations described in this article and in the Experimenter's section of the last issue we have 6TS using a loose-coupled Hartley circuit with series feed, 4XE using the same thing with a slightly different arrangement of the parts, 9EK used a loose-coupled Colpitts circuit and 1XAM used a circuit in which the concentrated capacities and inductances have been so reduced that it may be analyzed as either a Colpitts or Hartley circuit, depending on which of the capacities are adjusted to be the smallest.

Very well—it wasn't "a new circuit."

The Stations

1XAM at S. Manchester, Connecticut, has been described in the Experimenter's section for February, turn to that article for all details on the sending set and antenna. The receiving set is shown here and no ex-

so very thoroly described by the excellent photographs that there is not a great deal to say there either. 4XE is a station at

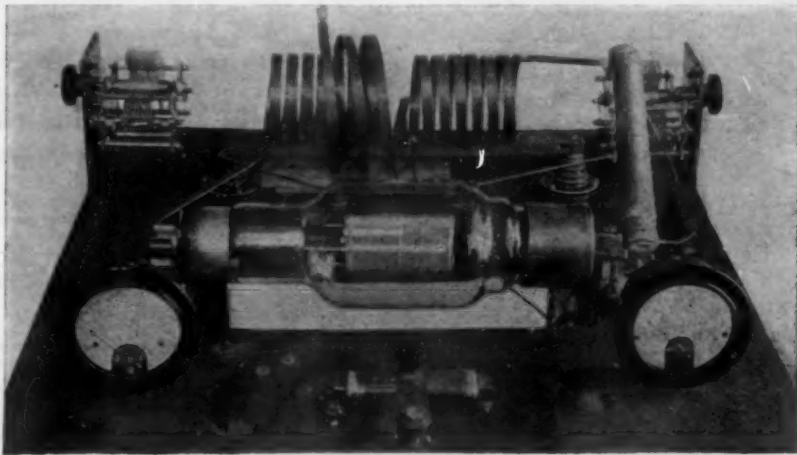


THE TUNER AT 6TS

Regeneration condenser at the left, next filament rheostat (Bradleystat), then the tuning condenser with vernier control.

which a tremendous amount of test and experimental work has been done; therefore style is generally neglected in favor of immediate results. This isn't the same thing as a junk station—far from it.

6TS, owned by Ed. Willis, is located one



TRANSMITTER AT 6TS

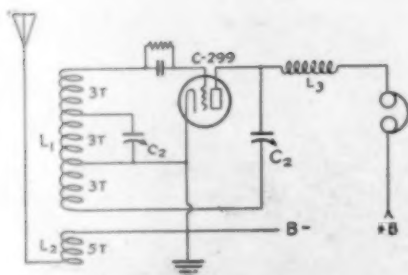
Tube is a UV-204A and the plate supply is from a 2200 volt transformer. 100 turn r.f. chokes (not shown in the foto) are supplied in both plate supply leads. Just back of the tube is the plate stopping condenser, suspended from a pair of small porcelain insulating pillars. In the original foto this condenser can be seen thru the tube. In the coil-system the outer 3-turn coil is in the antenna, the coil at the right is in the grid circuit, and the coil at the left is in the plate circuit. The corresponding tuning condensers are placed next these two coils. The rheostat at the front of the board is made of an old heater unit.

planation is required except that which appears under the circuit diagram.

4XE, Wm. Justice Lee's station at Orlando (or is it Winter Park?) Florida, is

mile from the Pacific and about 18 miles west of Los Angeles. The sending set and the receiving set are described in connection with the diagrams but the antenna-and-

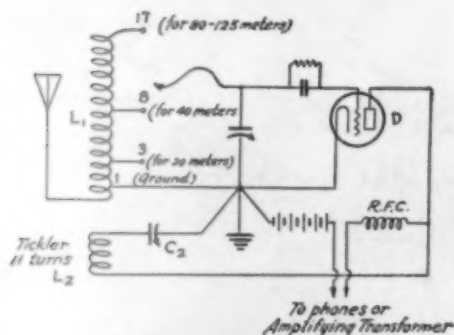
counterpoise system is special and needs some comment. When operating at 20 me-



THE RECEIVER AT 1XAM

- L1—9 turns of No. 16 D.C. wire wound basket-weave fashion to 3" diameter and tapped at turns 3, 6 and 9. Fanned out on one side.
L2—5 turns wound same as L1.
C1—5 plate variable condenser, capacity about 120 micro-microfarads.
C2—Regeneration condenser, 23 plate, capacity about 250 micro-microfarads.
L3—R.F. choke coil, 100 turns No. D.C.C. wound on 1" tube.

ters the small antenna and counterpoise are used, the two primary condensers are all



19-125 METER TUNER AT 6TS

- L1—17 turns No. 16 D.C.C. wire wound basket-weave fashion to a diameter that is not known exactly but can be guessed at from the photo. Coil tapped at 1 for the ground connection, 3 for 20 meter band, 8 for the 40 meter band, and all turns are used for the 80 meter band and on up to 125 meters.
L2—11 turn tickler, diameter about $\frac{1}{2}$ diameter of secondary and placed about 1" below filament end of secondary.
L3—R.F. choke coil wound on short length of dowel pin. This choke is not critical.
C1—Secondary tuning condenser, General Instrument Co. with General Radio geared vernier, capacity not stated in description.
C2—Regeneration condenser. Remler variable with half the plates removed, but original capacity also not stated (probably 500 micro-microfarads).
D—Detector tube with base removed. Tube is suspended from connecting wire to make it non-microphonic.

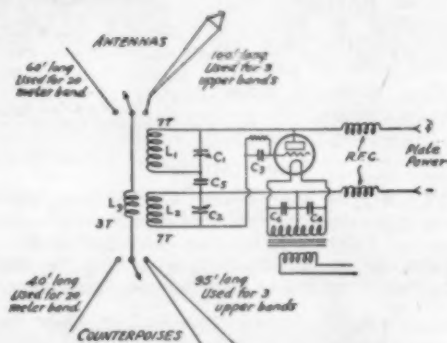
the way out and the set is operating at the third harmonic of the antenna system.

At 40 meters the set is switched to the larger antenna system which has a natural wave of 120 meters. Operation is again on the third harmonic.

At 75-80 meters the antenna series condenser is cut in and the large antenna system tuned down so that its fundamental is at the desired point. The two primary condensers are set nearly at maximum.

9EK is owned by the Burgess Laboratories at Madison, Wisconsin. The station was built by Radio Laboratorian W. H. Hoffman who is also the operator. Naturally enough a Burgess station operates on Burgess batteries—all the way thru, including the plate power.

The set uses a loose-coupled Colpitts cir-



TRANSMITTING CIRCUIT AT 6TS

Series Hartley circuit transmitter used at all waves from 15 to 80 meters.

L1—Plate coil, $6\frac{1}{2}$ turns, diameter may be judged from photo.

L2—Grid coil, 7 turns, diameter may be judged from photo.

L3—Antenna coil, see photo for details.

R.F.C.—100 turn r.f. chokes, not critical.

C1—General Instrument receiving condensers with pyrex insulation, 500 micro-microfarad capacity.

C2—Same as C1.

C3—Usual grid condenser.

C4—Filament bypass condensers, .002 microfarad capacity.

C5—Plate bypass condenser, .002 capacity, rated at 6000 volts.

The General Instrument condensers are made for receiving, but stand up when set is in tune. When it is out of adjustment they spark over.

cuit, somewhat unusual in amateur work. The antenna is vertical and consists of a 3" 3-wire cage; the counterpoise is a similar cage but extends downward, the two being supported in line by glass towel bars. This arrangement tends to cut down swinging of the wave.

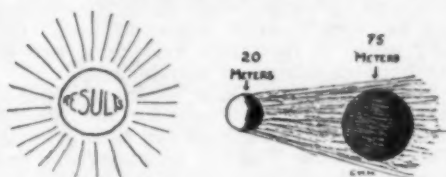
Because the circuit is unusual some comment on adjusting it may be of interest. We quote from a report by Mr. Hoffman—

"Place the grid clip and the grid tuning condenser connections on the same turn, near to the end of the coil. For 20-meter work adjust the plate variable condenser lead 3 turns from that of the grid connec-

tion. Place the plate clip at opposite end of coil from the grid.

"Keep the two variable condensers at approximately the same setting. This gives a 1/1 capacity ratio across the elements of the tube and this is found to work well at the low waves. For 20 meters the settings at 9EK are approximately 70 and 70.

"When everything is working properly raise the plate voltage to normal and couple up the antenna circuit, tuning it to resonance by means of the antenna series condenser. Loosen coupling to the antenna circuit until resonance can be passed thru (by varying the antenna series condenser) without any evidence that the oscillations in the antenna circuit are breaking off. Key the circuit while making adjustments and make



sure that the antenna ammeter always returns to the same maximum deflection. It will not if the coupling is too tight. (2" at 9EK).

"After proper coupling is found move the plate clip toward the center of the coil until maximum or desired plate current is taken by the tube."

Official Wavelength Stations

THE A.R.R.L. Official Wavelength Stations that have been appointed by Messrs. D. C. Wallace and C. M. Jansky Jr. are as follows.

O.W.L.S.	Call	Location and Ownership
1	NKF	Naval Research Laboratory, Bellevue, Wash., D.C.
2	1XAM	John L. Reinarts, 371 Htfd. Road, S. Manchester, Conn.
3	6BQB	A. A. Wahlender, 18th St., Sacramento, Cal.
4	7BK	H. F. Mason, 3335 33rd Ave. So., Seattle, Washington.
5	5MN	Horace Biddy, San Antonio, Texas.
6	9AAL	Frank L. Wilcox, 4602-A Delmar St., St. Louis, Mo.
7	New Zealand 2AC	I. H. O'Meara, Gisborne, New Zealand.
8	1XW	F. H. Schnell, 282 Fern St., West Hartford, Conn.
9	9ZT-9XAX	D. C. Wallace, 54 Penn. Ave., Minneapolis, Minn.
10	1MK	A.R.R.L. (Headquarters Station), Hartford, Conn.
11	8GU-8XC	Dawson Billey, 450 West 9th, Erie, Pa.
12	9XI	Engineering Department, University of Minnesota, Minneapolis, Minnesota.
13	1CK	Philip F. Robinson, 149 Hollis Ave., Braintree, Mass.
14	1AWW	T. F. Cushing, 78 College Street, Springfield, Mass.

15	3BE-3ZW	Herbert A. Wadsworth, 1220 Jackson, N.E., Wash., D.C., and Walter A. Parks, C. E. Nichols, 739 Weadock Ave., Lima, Ohio.
16	8AA	J. C. Lisk, 902 S. Elizabeth, Lima, Ohio.
17	8CCI	B. J. Kroger, 205 Taylor St., Chevy Chase, Md.
18	3APV	Wm. Justice Lee, c/o Chase & Co., Orlando, Fla.
19	4XE	LeRoy Moffet Jr., 824 South Elm, Norman, Okla.
20	5ZA	W. F. Shoening, 5010 Gravois Ave., St. Louis, Mo.
21	9DXN	G. L. Barker, Henning, Minn.
22	9EGU	Lester Picker, San Ysidro, Calif.
23	6ZH	J. H. Robinson, 1910 Magnolia St., Dallas, Tex.
24	5AKN-5XBH	

The number is now so large that everyone can use these O.W.L. stations to spot calibration points on wavemeters and tuners. As we have explained before—there will be no schedules, the stations will simply carry on their regular work on the 5, 20, 40, 80 and 150 meter bands, announcing the wave they are using at the close of each sending. For instance, 9ZT will finish up

"u 9ZT 76" or "u 9ZT 180" or "u 9ZT 42"

This is not the same thing as the Bureau of Standards system, since there are no regular schedules and there is no attempt to secure the extreme accuracy that is provided by WWV, 9XI and 6XBM. The O. W. L. S. can be depended on to 1% however in most cases and 9ZT-9XAX checks them up regularly to see that their waves are correct.

All correspondence regarding O.W.L.S. should go to D. C. Wallace at the address listed above.

Photographs intended for publication in QST should be printed on glossy paper, should be large, and should preferably be taken by a commercial photographer. Snapshots are practically certain to be unfit for publication. Photographs that have too much of one general tone, such as gray, also fail to reproduce satisfactorily, so be certain that sufficient contrast in white and black are present. To get the kind of pictures that will reproduce *really well*, use a small lens opening and make a long exposure—the smaller the opening the better.

E. H. Giddings of 9GC says that someone is using his call illegally, as he has not been on the air in several months and yet is receiving stacks of cards. He would appreciate help in locating the offender; whether he be someone with a bum fist or an actual law-breaker. If it is a law-breaker, he had better take warning for the inspector has been put on his trail.

The McCaa Anti-Static Devices

Part II

By S. Kruse, Tech. Editor, from notes by Dr. D. Galen McCaa

Last month we presented an analysis of the theory of McCaa Oscillator and Repeater Systems of static reduction. In this, the second part of the article, we give all constructional details that are essential the building of such a device. We have endeavored to give those specifications that are important—other dimensions and values may be changed to suit the facilities or apparatus which the reader may have available. It must be borne in mind that these devices are still in the experimental stage and require some degree of ingenuity on the part of the builder for their successful operation. A careful reading of both parts of this article will go far toward getting the understanding of the devices that will be necessary.

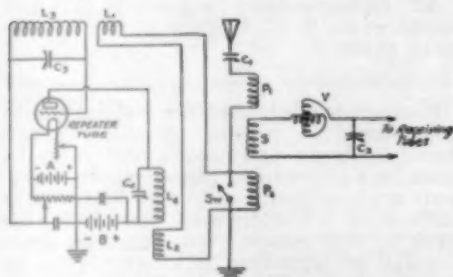
Of especial interest to the telegraphing amateur is the McCaa Band Selector also described in this part of the article. This device is out of the experimental stage, and one that will operate beautifully can be built directly from the detailed specifications that we give.—Editor.

IN part one of this article the statement was made that the signal/static ratio seems much better than 1/1, altho the theory calls for a 1/1 ratio.

Dr. McCaa suggests several possible reasons for this. To begin with, it is the peak values that should be the same, therefore the energy content of the static surge in the secondary will be less than that of the signals. In addition to this it seems plausible that both the detector tube and the headset are less responsive to the same amount of energy when it is in the form of impact than when it is in the form of a more nearly sinusoidal curve.

Constructional Dimensions

With that we will drop theoretical discussion of the tube-operated anti-static de-



DIMENSIONS FOR A "REPEATER SYSTEM" TO COVER BROADCAST RANGE

P1, P2, S, L3 and L4, 50 turn honeycomb coils or other coils with the same inductance, i.e. .169 millihenries.

L1, 6 to 10 turns, 2" diameter, single layer.

L2, variable, 50-75 turns, 2" diameter. Tapped honeycomb convenient.

vices and proceed to the dimensions from which one of the "repeater type" may be built. The dimensions that will be given are not supposed to be final, they are not even representative of any great amount of effort in this direction for most of the work has been done in the direction of circuit-action rather than the details of best coil

designs and such other matters. It is therefore entirely likely that these dimensions can be very greatly improved upon, but they work, in fact they work very well in the Broadcast-band of wavelengths.

If one were to build a set for the broadcast range, that is to say for the 200-600 meter band, some changes can be suggested. The variometer V is not necessary and can be replaced by a fixed coil if the tuning condenser will cover the range. (On the basis of a very limited experience with the circuit the editor prefers this construction to one in which all of the secondary is put into the coil S. There is much less tendency for static noises to get into the secondary if the coupling coil S is small and then is loaded by a series coil. Tech. Ed.)

The secondary and the secondary loading coil could be replaced by single layer coils with some advantage as to losses, especially as it is best to let this tuned system feed into a non-regenerative detector or a stage of R.F. amplifier. It is therefore quite important to make this secondary circuit as good as possible.

The reason for saying that the detector should be non-regenerative unless there is a stage of R.F. ahead of it is not readily stated in a few words but the effect is understood and is very definitely undesirable. Therefore an arrangement is desirable in which the detector is preceded by a good tuned stage, as in the Browning-Drake "regenerator" or by a pair of fixed stages such as Acme R2 and R3 transformers will provide.

For best results the entire tube system must be enclosed in a grounded shield as shown for the laboratory setup at Lancaster. (See our February issue). Such a shield must be well made or else it is worthless. The box must be entirely closed and wires must leave thru the smallest possible openings. The lid should have a flange of metal that turns down inside the box. Shafts of condensers, rheostats etc., should come out thru fairly close-fitting openings and carry metal dials which are connected to the shaft and set close to the metal panel.

This sort of construction will prevent direct pickup of static by the tube system so that the anti-static circuit will not be crippled by accidental inputs which it cannot be expected to control.

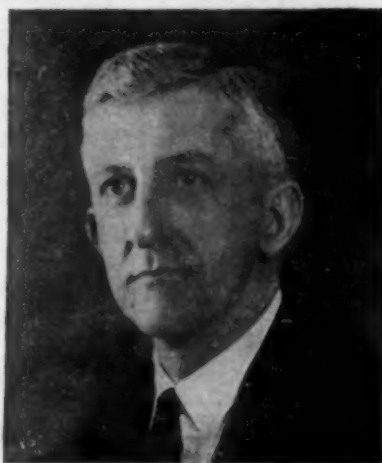
Operation

Begin by closing the switch Sw. Tune in a station by using the condensers C1 and C2. Now open the switch Sw. and change the coupling between both P1 and P2 until nothing is heard in the secondary, indicating that both the static and signal have been balanced out. If the static does not balance out one of several things may be wrong. Perhaps the ground connection is not good. (Very few receiving grounds are even fairly good. Waterpipe or steampipe grounds are practically never good enough.) Perhaps the trouble is a more simple one—the coils P1 and P2 may be too close to S. They should stay at least $\frac{1}{2}$ " away from S. At this point it must be admitted that the simple circuit shown here cannot completely get rid of such things as violent static and street-car "plops" for the very reason just mentioned—there are some static couplings that are not guarded against. For the man that wants to do a complete job several more complex circuits have been developed and operated with complete success.

However, assuming that a fair static-balance has been secured, proceed by turning on the filament of the repeater tube and begin to tune its grid and plate circuits, trying various degrees of coupling between these circuits and the coils L1 and L2. The first attempt of this sort will be pretty tedious because one will not know what couplings are to be used. After the correct grid coupling is found it can be left alone, the whole device being adjusted by tuning the grid and plate circuits with a little final adjustment of the plate coupling.

This sounds pretty intricate, especially

oscillating. As a matter of fact the circuit as shown is too complex to handle with



DR. D. GALEN MCCAA

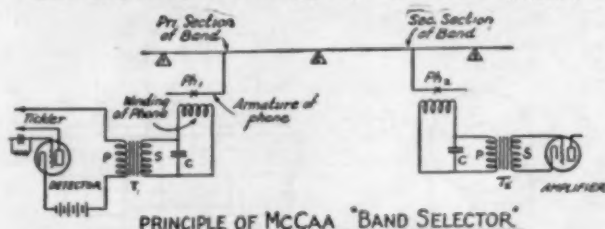
Dr. McCaa's interest in radio began after several years' work as Roentgenologist at the Lancaster (Pa.) General Hospital.

He first turned to the development of a radiofane and, as has been reported in our February issue, operated probably the first radiofane in America. These tests were made in 1914 between the old New York Herald station at the Battery and the S.S. Tyler of the Old Dominion Line.

The famous Marconi suit on the use of coupled tuned circuits forced a change of direction of the work, and during the next few years there was devised a system of transmission that did not infringe that patent. The system was tested on the S.S. Tyler and was ready for the market when the war intervened.

Dr. McCaa then spent some time at the Radio Section of the Bureau of Standards, leaving that organization to work on anti-static devices. The first work was done with Colonel John Firth, and the device was sold to the Federal Telegraph Co. in 1920, at which time Dr. McCaa joined their staff.

The more recent work has been at the Radio Laboratory in Parkesburg, Pa., the organization fostered by Mr. Horace Beale of 320, former Director A.R.R.L.



PRINCIPLE OF MCCAA "BAND SELECTOR"

- 1, 2 & 3, metal bridges over which band is stretched.
- Ph1, first Baldwin 'phone which acts as a motor.
- Ph2, second Baldwin 'phone which acts as a generator.
- T1, input transformer.
- T2, output transformer.
- C, C, tuning condenser for the transformers.
- B, stretched metal band.

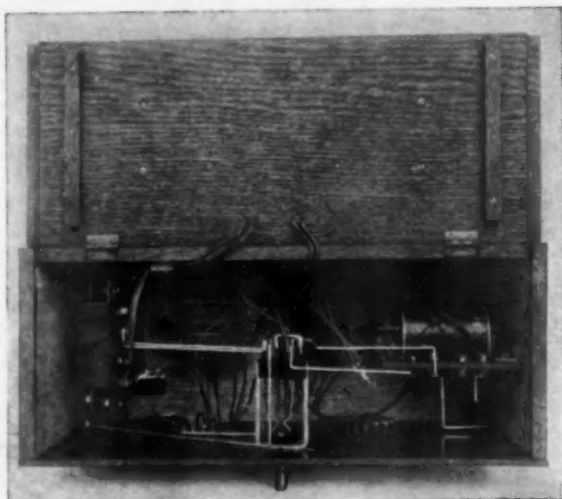
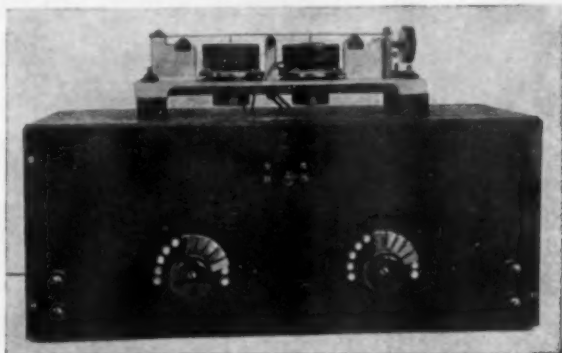
as the plate circuit must always be kept a little off tune to keep the repeater tube from

controls and of course nobody has three hands, but people seem to worry along with

pleasure but it is perfectly easy to build it in simpler form. The secondary circuit (S, C2, etc.) can be made to operate from the same control knob as the grid circuit of the repeater. The grid coupling can be left alone after one setting. The plate coupling can be set at an average point for most work and never needs a great deal of adjusting anyway. This leaves the plate-circuit tuning condenser of the repeater; the double tuning condenser for the two grid circuits; and the broad-tuning antenna condenser. That is three

three-condenser broadcast receivers of other varieties. In any case, the three-handed broadcast receiver is gradually being gotten rid of, and the same amount of thot put on the present circuit will also simplify the McCaa "repeater" control.

That has not been attempted as yet. The



THE McCAA BAND SELECTOR

work has been entirely on the circuit-operation and not on the mechanical details.

The Band Device

The Band-device is of an entirely different sort, employing no vacuum tubes at all but depending purely on mechanical resonance and electrical (dynamic) damping. It is a telegraphic device and has no usefulness at all for radiophone work. However for radiotelegraphy it is more desirable than the circuits that have been described—there is nothing to adjust and the device is very rugged. The radiotelegraph operator must jump from one tune to another in a

way that broadcast reception neither demands nor necessitates. For such work a "three-handed tuner" is hopeless, therefore the *most* important thing about the band device is that it *does not add a single control* altho greatly decreasing static.

A band of soft iron, 20 mils thick and $\frac{1}{2}$ " wide, is stretched across three bridges, 1, 2 and 3, so as to form two vibrating sections of the same length. Each section is $2\frac{1}{2}$ " (or 3") long and as the two are of the same length and under the same tension they will be tuned to the same note.

The mass, tension, elasticity and length of the band have been chosen to put this tune inside the usual audio range—1000 cycles being a pitch to which the band can be tuned readily by means of the tension screw provided for that purpose.

The band presents the tonal properties of a tuning fork, in that it will respond readily to impulses corresponding to its natural period but is not at all sensitive to irregular impulses.

The section at the left acts as a primary section. This section is driven by a Baldwin receiver which has been removed from its headband, has had its diaphragm taken out and the little rod that usually drives the diaphragm connected to the middle of the left span of the band. When this phone receives currents of the pitch to which the band is tuned it will vibrate the band. The stiffness of the band is great enough so that the vibrations will be carried across the central bridge (2) into the right-hand, or secondary, section of the band. This secondary section being tuned to the same pitch will vibrate readily, thereby operating the armature

of the second Baldwin 'phone (Ph. 2) and causing it to act as a small A.C. generator. The output of the second phone will be fed thru the output transformer T2 to an amplifier or a headset.

Static and signals of other pitches will not get thru the device at all well because they are required to pass thru the two mechanically tuned sections of the band—and get lost in the process.

The Tuned Transformers

When the band-selector was first put into

use it had one great weakness, just the same as all other mechanically tuned selectors and repeaters before it. This weakness was that the band insisted on vibrating after the signal had stopped coming in, thereby putting "tails" on all the dots and dashes so that they ran together and were hard to read.

To get rid of this difficulty the input and output transformers were tuned as shown. This had two effects. The lesser one was to give an additional increase in the signal/static ratio as the static now had 4 tuned circuits to go thru (2 electrical and two mechanical) but the main gain was to stop the band promptly when the signal stopped. The reason for this action is that the tuned circuits withdraw energy from the band just as soon as the signal stops, thereby giving a sort of "dynamic braking" action. The improvement is very great altho the tuning of the transformers is not at all exact.

Operation

One might think that the band needed tuning for each separate station but this is not correct. One simply sets the band at some convenient pitch that the operator happens to like and then heterodynes the received signal until its pitch falls on that of the band. For spark signals that is not possible and the band must be set to the spark pitch, making an extra adjustment. The band tunes very sharply and is a help in getting rid of interference. The horrible mush from stations using synchronous rectifiers for plate supply can be gotten rid of almost completely and the "purr" from A.C. plate supplies is much reduced.

In general it is well to use the band-selector between the detector and the first audio stage. Where signals are weak it may be used between a first and second audio stage.

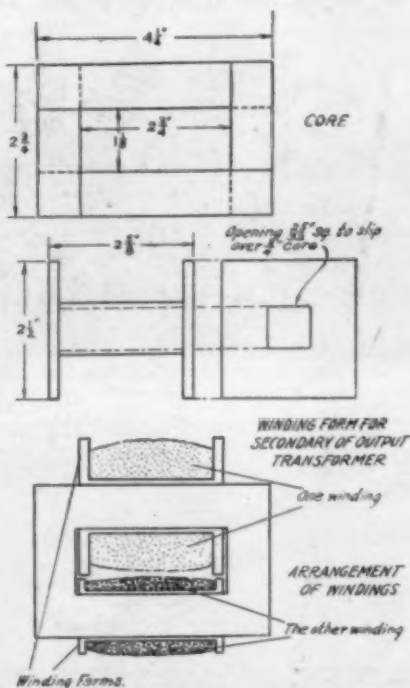
Results

The improvement made by the band device is absolutely startling. The device has been tested out at the San Francisco station of the Federal Co. and gave the following results.

Straight Receiver		Anti-Static System	
Signal	Static	Signal	Static
Audibility	Audibility	Audibility	Audibility
1600	3867	1234	5
Ratio 1/2.4		Ratio 246/1	

The words "anti-static system" are used to indicate that a device was used with the band selector to protect it from the "bang" or "crash" variety of static. Where there was nothng but ordinary rumbling and hissing static (or power leaks) the results would be about the same without the extra

device. In a demonstration at 3ZO it was shown that the band device would completely eliminate the noise made by a loose-jointed buzzer coupled to the antenna system and making a ragged noise like a bad



THE TRANSFORMER USED WITH THE BAND-SELECTOR

Note—Ordinary audio amplifying transformers will not work.

Core section is $\frac{3}{4}$ " x $\frac{3}{4}$ " and is composed of 20 mil iron.

Input transformer windings.

Primary, wound on one long side of core, 2500 turns No. 40 enameled wound in layers as nearly as possible.

Secondary, wound on other long side of core, 2500 turns No. 24 silk-and-enameled covered wire separated from core by one layer of thin bristol board or other suitable $1/64$ " insulation. Wind in layers.

Output transformer windings.

Primary same as secondary of input transformer.

Secondary, 10,000 turns No. 40 enameled wire wound over $1/64$ " of insulation, layer winding as nearly as possible.

One layer of thin, but good, waxed paper is used between each 2 layers of wire allowing the windings to keep fairly even.

insulator on a 25-cycle line. Altho the buzzer noise was strong enough to drown out all signals the band device removed the noise so that it became a faint murmur and easy reception of signals was possible. Tape record of signals were also made using a vibration-proof type of relay developed by Dr. McCaa. (In passing it is interesting to

say that the operation of this relay seemed perfectly satisfactory with signals of ordinary headset strength, altho the whole affair is quite small and so rugged that it can be bounced on the table while working. It uses no tubes or complex circuits but is a straightforward relay and operates a standard A. T. & T. "pony" relay which in turn operates the recorder.) All of this was done with no interference from the buzzer altho, as has been said before, it absolutely blanketed all signals when the band-device was taken out.

Tri-State Convention—Pittsburgh, Pa.,

By 8CEO

OVER 150 amateurs attended the Tri-State Radio Amateurs Convention, the first one for Pittsburgh, which was held January 29th, 30th and 31st, and this in spite of the fact that only a few weeks were spent in preparation for the event. "Hams" from Ohio, West Virginia and Pennsylvania (the three States giving the name for the convention) were in attendance and one good "ham," 6BRF, came from the West Coast.

The convention opened during one of the heaviest snowstorms in years and only a small number had registered up to noon Thursday.

After lunch they began to arrive in greater numbers and at 3:00 P. M. Chairman P. E. Wiggin, 8ZD, gave a speech of welcome to a fair-sized crowd. The bunch then proceeded to WCAE, the Kaufmann and Baer broadcasting station, where they were made welcome by Thomas McLane, 8BDI, and Al McChesney of the mighty 8VQ.

The first night was open and advantage was taken of this to visit stations and friends.

On Friday morning a special street car took the crowd to Station KDKA, where the 63-meter transmitter was given especial attention. Mr. C. W. Horn and his assistants very kindly answered a million questions after explaining the layout.

On Friday afternoon an interesting technical meeting was held with papers and talks, before a good crowd.

Friday night an excellent entertainment program was furnished by the Committee. The music, etc., was broadcast from the Roof Garden of the Hotel Chatham by WCAE. Many telegrams were received from a distance from amateurs listening in on the program.

On Saturday morning examinations for licenses were held and an interesting trip

to the A. T. and T. exchange was taken. (Every amateur should visit a telephone exchange. They would feel more kindly towards unavoidable delays after seeing what takes place when a call is put in.)

In the afternoon, contests, a traffic meeting and a technical meeting with several excellent papers, took up the entire time.

Saturday evening the banquet was given and the roof garden was crowded. Addresses were made by Mr. S. W. Edwards, 8th Dist. Supervisor, Mr. A. A. Hebert, Field Secretary-Treasurer of the A.R.R.L., Mr. C. W. Horn of the Westinghouse Company and Mr. John H. Miller of the Jewell Inst. Company. After the speaking the drawing of prizes took place. The first prize, a Grebe 13, was won by Thompson Baber of Swissvale, Pa., a young ham just starting out in the game, and he received the congratulations of all. Many other valuable prizes were distributed.

The convention concluded with the solemn rites of initiation into SOTAB.

This impressive ceremony, the last event of the convention, could scarcely fail to leave in the minds of those who had the privilege of witnessing the ritual, a sense of duty and obligation to amateur radio.

Congratulations to the committee.

And here's looking forward to the next one.

Raising the Ante

EFFECTIVE with the current issue, the newsstand price of QST is advanced to 25 cents per copy. The League has delayed this advance as long as possible but it is now necessary. Practically every other radio magazine of national reputation has long since sold at at least 25c per copy, many of them higher. We know that QST is worth it, and we trust our readers will agree with us. The few cents additional that each reader will expend are very little to him, but in the aggregate they will enable us to do a materially better job in the publication of QST and in carrying on the work of the A. R. R. L.

By the way, there is no increase in A. R. R. L. dues and the opportunity to save money by joining the League is bigger than ever. Have a look at the handy application blank on page 64, O.M.!

9BJB says that glass awning rings make nice antenna insulators. We should say, judging from the size of them, that they ought to be FB for use on single wire receiving antennas, at least.

The New Magnavox Tube

By Herbert E. Metcalf*

MODERN radio reception has changed radically in several ways in the last few years. First, in the almost universal use of radio frequency amplification for broadcast reception; and second, in the adoption of low-wave trans-

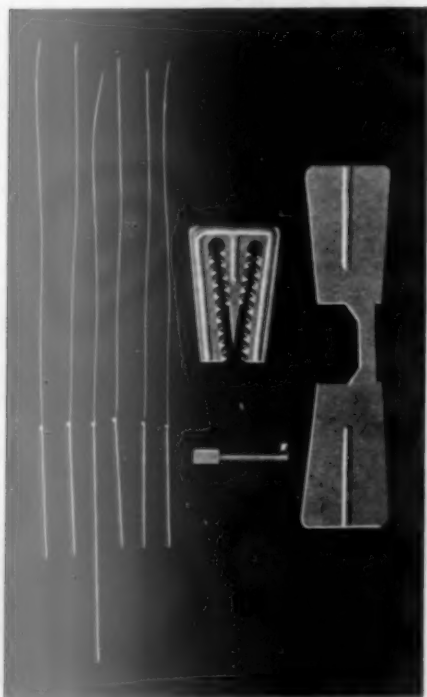


FIG. 1. METALLIC ELEMENTS USED IN TYPE A TUBES.

mission and reception for amateur traffic, more particularly in continuous waves.

The vacuum tube I am about to describe was developed with the idea of meeting the needs of both these changes. The secret of efficiency in radio-frequency amplifications, oscillation and detection in the wave band of from 20 to 600 meters, lies in making a vacuum tube having a low internal capacity and yet being able to handle a fair amount of power.

Magnavox Type A Tubes are a radical departure from standard tube practice and have a low inter-element capacity without loss of other essential characteristics.

Referring to Figure 1, it will be seen

that not counting the lead wires and filament, only three metal parts are involved—control electrode, anode and filament spring. These parts are all die stamped and are therefore, always alike. The control electrode is formed of a single piece of metal, slotted to receive the filament. This slot is provided on its edges with teeth, the teeth being bent laterally, away from the plane of the filament. This lateral bending not only gives increased electron control, but also widens the control field and makes it possible to secure uniformity in tube characteristics despite slight mechanical variations in manufacture. The writer has found that such teeth or serrations are necessary in order to obtain proper control action. The teeth alone control the electron stream and the remainder of the control electrode acts simply as a support for the teeth. By varying the number, size, shape and position of the teeth, tubes can be made to duplicate the characteristics of standard grid tubes, in much the same way as the number of grid wires control the characteristics of the grid tube.

After the control electrode is mounted the filament is placed within the slot as shown in Figure 2, the anodes are placed in position. The complete assembly is shown in Figure 3. It is to be noticed that the anodes are not parallel to the plane of the filament but are spread slightly at the bottom. The tube is then sealed and pumped by a new method which removes all undesirable gasses in about 80 seconds. The finished tube is shown in Figure 4, which also shows the method of insulating the prongs in the base.

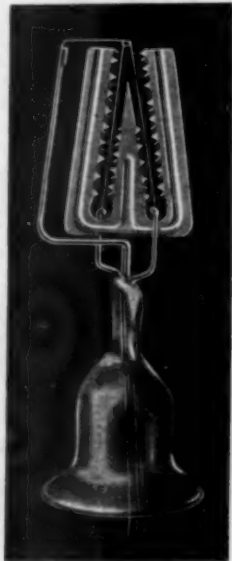


FIG. 2. PARTIAL ASSEMBLY SHOWING CONTROL ELECTRODE AND FILAMENT RELATION.

Electrical Characteristics

The audio frequency characteristics of Type A tubes are practically identical with those of the Radio Corporation, Cunn-

* In charge of Research and Development, Vacuum Tube Division of the Magnavox Company, Oakland, California.

ham, or DeForest Storage Battery Tubes, with the exception that the output impedance is slightly lower, with consequent

greater mutual conductance. The characteristic curve of the tube is practically a straight line which gives wonderful tone quality when used in broadcast reception. The filament of special "no-boil-off" material burns dully at 900° with a current consumption of .22 to .23 amperes. Plate current is 2.5 to 3.5 milliamperes under load. Total filament emission with control electrode and plate tied together is from 40 to 50 milliamperes at 90 volts. The tube is designed so that 120 volts may be used on the plates if desired.

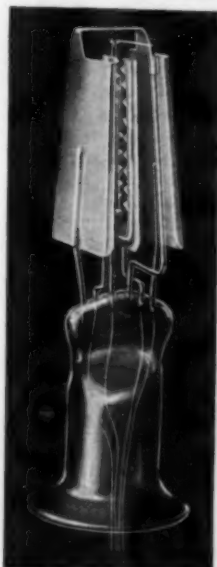


FIG. 3. COMPLETE INTERNAL ASSEMBLY WITH PLATES IN PLACE.

Inter-element Capacity

For comparative figures a number of Type A tubes and a number of standard storage battery tubes were measured on a General Radio Precision Capacity Bridge, and the averages are given in the following table:

	Control Electrode to Filament $\mu\text{fds.}$	Plate to Filament $\mu\text{fds.}$	Control to Plate (Fil. Free) $\mu\text{fds.}$	Control to plate (Fil. Gndd) $\mu\text{fds.}$
Average Type "A" Tubes	5.0	5.0	5.0	2.4
Average Other Tubes	6.5	6.0	11.2	5.5

Thus it is seen that the highest internal capacity is not over 5 $\mu\text{fds.}$ and that the filament-grounded control-electrode-to-plate capacity is only 2.4 $\mu\text{fds.}$ and less than half that of standard tubes. There are two reasons for this low capacity. The control electrode is composed of just one flat piece of metal instead of a cylindrical grid. This alone reduces the control-electrode-plate capacity greatly. The other factor lies in the greater plate spacing employed in the Type A tube. The fact that electrons are free to pass to the anodes without obstruction, allows greater spacing for the same impedance. In practice I have found that the same impedance can be ob-

tained with about double the spacing of the ordinary grid tube. The writer is now working on elimination of capacity to a still greater extent by reducing the actual amount of metal to practically the teeth only. This should bring the internal capacity of the tube to very close the capacity of the leading-in wires.

This low internal capacity makes Type A tubes hard to oscillate in tuned plate circuits. This means that tuned R. F. amplifiers are practically self-neutralizing when Type A tubes are used. When using electromagnetic feedback, however, they become highly oscillatory and oscillate freely and steadily for C. W. reception down as low as 20 meters without the least trouble. I am inclined to believe that tubes used without the base can be made to oscillate at lower wavelengths, but no experiments have yet been made to determine the extreme bottom range.

In conclusion, I will say that Type A tubes in audio frequency circuits give a beautiful clarity of reproduction. Careful



FIG. 4. COMPLETED TUBE AND VIEW OF BASE SHOWING BAKELITE INSULATION.

experiments have indicated that Type A tubes will operate with maximum efficiency as follows:

1. Detector using control-potential control-current characteristics for rectification.
2. Detector using control-potential plate-current characteristics for rectification.
3. Radio frequency amplifier at low wave lengths.
4. Intermediate frequency amplifier.
5. Oscillator both low and high wave lengths.

All Aboard For Paris

First Congress of International Amateur Radio Union April 16-20.

Are you going over?

THE first international congress of radio amateurs ever held will convene in Paris from April 16th to 20th, inclusive, having as its primary purpose the formation of an International Amateur Radio Union. It is expected that there will be representatives there from the amateurs of every land. The wonderful strides made in international amateur communication this winter have shown clearly the possibilities of international organization. A most important meeting is expected to result, one from which the spirit of Amateur Radio as we know it may echo all around the world, bringing into existence an association which will play the same role in international amateur affairs as our own A.R.R.L. does in North America.

It will be remembered that about a year ago our president was in Europe and established the preliminary contact that has resulted in the calling of the Congress. The three leading French amateur societies have banded to arrange the meeting, and announcements have been mailed all over the world. A secretariat has been established at 2 Rue de l'Eschaude-Saint-Germaine, Paris (6e), and details are being worked out rapidly.

A preliminary list of topics slated for consideration at the Congress, received in this country about Christmas, lists (a) the organization of an I.A.R.U.; (b) methodical organization of technical tests by amateurs; (c) wavelengths for radiotelephone and amateur transmissions; (d) educational use of radiotelephony; (e) selection of an international auxiliary language. League Headquarters will be very glad to receive suggestions from the membership on additional subjects which should come before the Congress. The A.R.R.L. has been requested to submit a proposed constitution for the I.A.R.U. and is particularly interested in the first item on the agenda. At this writing we have not learned what plan of procedure will be followed at the sessions but because of the difficulty offered by diverse languages it seems probable that formal international diplomatic procedure will govern. Under this scheme a sub-committee would be formed to handle each item on the agenda, every nationality represented being invited to submit a written monograph to the sub-committee handling that subject. The decisions of the sub-committees would

then be combined in a "draft convention" to go before the whole Congress for approval and signature by the representatives present. To the American mind, used to direct action and conference-table get-togethers, this may seem a very complicated and formal method of getting things done but something of this sort is necessary where many languages are spoken. We may feel certain that, in some fashion or other, there will be adequate opportunity for us to be heard on the various subjects under consideration.

The I.A.R.U. is going to be a federation of amateur societies chiefly national associations, with representatives to speak for them at the Congress. Although only these official delegates of national societies will have the right to vote, all amateurs are welcome. About a dozen A.R.R.L. Division organizations, convention organizations and clubs are raising funds to send one or more of their number to the meeting. The two official delegates which the League probably will have in attendance will be very glad to have the assistance and support of these representatives. It will be fine if we can get up a big A.R.R.L. party and sail over together, and show the rest of the world what American hams look like. In fact that is the idea of this unofficial representation—it is a "contact mission". It will be worth a good deal to us Americans to have a considerable number of our fellows come to meet and know intimately the amateurs of other countries. It is worth the while of any club or similar organization that can afford it, to send one of its best amateurs to Paris, and home via London, to establish this contact and come back home and tell what he saw. Individual amateurs are very welcome, too. Now who's going?

We want to get up an A.R.R.L. party to sail from New York on the S. S. "Mauretania" on April 1st, returning to New York on the S. S. "Berengaria" on May 1st, providing thirteen days in Paris and three in London. We have arranged with the Davis Travel Service, 102 Pearl St., Hartford, Conn., to act as our booking agents. Mr. F. Irvin Davis, of that firm, can make every desired reservation and make all arrangements necessary for everybody that wants to go. We urge everybody who would like to go along with the gang to get in touch with Mr. Davis immediately. He has steamer plans, all the dope on passports,

etc., and can even make your hotel reservations abroad.

Our contemplated itinerary provides for sailing on the "Mauretania" on April 1st, arriving at Cherbourg on the 7th, thence by rail to Paris; in Paris from the 8th to the 20th; leave Paris 21st via Calais and Dover to London; the 22d to 24th in London; then to Southampton on the 25th and home on the "Berengaria", due to arrive in New York on May 1st. We are going to travel *second class*, which is good enough

for any of us, and save money. The minimum cost of the trip, from New York and back to New York, will be right around \$600. This covers steamer fare (with meals), taxes, passport expenses, hotels, transfers, meals, tips, etc. The steamer accommodations contemplated in this estimate are on the basis of four hams to a cabin, inside staterooms. If there are only three or two to a room, or if an outside room is secured, the fare is higher, running up to where about \$175 will have to be added to these figures if the round-trip is made in outside stateroom two to a room. Mr. Davis will be glad to arrange to bunk

hams together, and Headquarters will be glad to help. For just a little additional money all kinds of interesting extra things can be done. For instance, for \$14 extra, one can fly from Paris to London; for \$15 three long rubberneck-wagon trips can be had around Paris; two such around London for \$12; we can have a peck of fun on the side.

Mr. Davis will need from each man registering on this trip the following information: Name, home and office address, whether you wish to travel first or second class, kind of accommodations desired, also a deposit to make steamship reservations positive, being 25% of the passage money if first-class, or \$30 per berth (for each direction) if second class. Also the following information in connection with a government information blank which has to go with all steamship tickets,

Country of which a citizen or subject; by birth or naturalization; country where lived before coming to the U.S.; country where going to live; last arrival in the U. S. (date and port); race; occupation; married or single; born (date, city or town, county, state, country); if naturalized, the Court, date and number.

Passports are a mean problem, and as they take considerable time, they should be started at once. Apply to the clerk of the nearest State or Federal Court for information; the government also maintains passport agencies at Boston, New York, Chicago, Philadelphia and San Francisco. You are required to appear in person with documentary proof of citizenship and two photographs of yourself, plus a \$10 fee. Visas of passports are required in France and England which Mr. Davis can arrange.

When you have obtained your passport, it should be signed in the two spaces provided and mailed to him with a check for \$21.00, whereupon he can obtain visas. Also, a Certificate of Compliance must be obtained from your District Collector of



Internal Revenue, showing that you have complied with the Federal Income Tax Law, before you will be permitted to leave the country. Aliens should also obtain a re-entry permit on Form No. 631 of the Immigration Service, to re-enter the United States.

A lot of trouble, but it's going to be worth it all. Years ago, just as we started having conventions, there was a terrific "kick" in meeting the fellow you had worked so often on the air but had never seen. Here will be our chance to have the same experience with the amateurs of other lands whose signals we have heard or worked. In years to come, when the I.A. R.U. is a powerful world-known influence in amateurs affairs, we will look back on this First Congress in Paris and be proud and glad that we attended and helped to put the job over.

—K. B. W.

A Handy Wavemeter Trick

MOST of us own wavemeters that don't go down far enough. For the past year we have been nagging all wavemeter makers, trying to get from them something that will go below 10 meters—and they can't see it at all! They keep right on making things that stop at 30 or 40 meters. And that's right in the face of the fact that 20 meters has just put over the biggest thing since the audion—long range daylight work.

Very well—if they will not furnish us with meters we will have to make them ourselves.

Several ways of doing this have been described, the harmonic schemes described by the present writer, Bliley's method of transposing onto another scale, Reinartz's scheme shown last month—and now we have a still easier one, and it is due to Reinartz again.

The Resonance Coil

Most of us know that a coil has a natural wavelength—because it has inductance and capacity in its windings. Some of us know that it is perfectly easy to find that natural



THE REINARTZ RESONANCE COILS

wavelength and its harmonics—but that didn't suggest anything useful to us. It did to Reinartz though—and the scheme followed.

He began by winding No. 30 D. C. C. wire on a $3\frac{1}{2}$ inch tube. I don't know how he knew when to stop, probably he did it the way the rest of us do—"wind until you are sick of it and then put on that much more." At any rate the finished winding was $4\frac{1}{2}$ inches long. It was then dropped into hot paraffine and picked out to drain. Then the receiving set was put into oscillation, the coil hung near it by a thread and the tuning controls worked back and forth un-

til a click showed resonance with the coil. This happened at 160 meters, according to a General Radio wavemeter. Another coil made to the same dimensions would perhaps have resonated at 154 or at 163—but that isn't the point for it does not change the scheme a bit—one can start with any wave that can be reached with the wavemeter you have now.

The coil has a natural wave of 160 meters—what of it? If the natural wave is at 160, then the second harmonic is at 80, the third harmonic is at 53.3, the 4th harmonic is at 40, etc. Just keep on going down with the receiver and hunting for resonance clicks. Whenever you find one—stop right there, put your new small coil on your wavemeter condenser and spot that point on the wavemeter dial.

In this way it is possible to go down as far as the receiver will oscillate, and to find coil-harmonics as low as the 21st, altho the ones after the 5th are rather hard to locate. It is much easier to do the whole thing if a small meter is used in the detector plate circuit instead of using the click method. This is more accurate and more sensitive. The meter can be a 0-10 milliammeter and if you don't have such a thing you can often make a voltmeter serve by disconnecting the series resistance. In the same way an ammeter will sometimes do if the shunt is taken off and some R. F. meters will do if the thermo-couple is disconnected.

However, it isn't overly easy to chase such a lot of harmonics, so it's better to make some smaller coils. Incidentally that also checks the work with the large coil and makes it a little safer from the accident of missing a harmonic—and that's something to be watched. Even if you make the other coils, don't depend on marking the wavemeter dial. Draw a regular wavemeter chart and then a kink in the line will warn you that something has happened—otherwise you may never discover that the 3rd and 4th harmonics have been mixed.

The other two coils are wound with the same wire on the same sort of tubing and treated in the same way. The only difference is that the medium coil has a winding $1\frac{3}{4}$ " long and a natural wave of 66 meters while the small coil has a winding $\frac{1}{2}$ " long and a natural wave of 30 meters.

Now then—that's the easiest wavemeter stunt we have ever heard about, there's no excuse at all for not knowing where 20 and 5 meters are—even if there isn't a single manufacturer that believes that there are such wavelengths.

—S. K.

New Regulations for Transmitting Stations

AMATEURS having transmitting stations should take close note of the following regulations of the Department of Commerce, which went into effect January 5, 1925, as a result of studies made at and subsequent to the Third National Radio Conference.

Wave Lengths

150 to 200 meters, 75 to 85.7 meters, 37.5 to 42.8 meters, 18.7 to 21.4 meters, and 4.69 to 5.35 meters, are allocated to amateur stations.

Spark Transmitters

Amateur spark transmitters produce considerable interference and consequently are responsible for many complaints. Amateur owners of such transmitters should abandon their use as early as possible and adopt a system producing less interference. Until such change is made they will be permitted in the wave length band between 170 and 180 meters and should have a decrement not exceeding .1. [Note 1.]

Phone and ICW Transmitters

Phone and ICW (Interrupted Continuous Wave) transmitters will be permitted in the band from 170 and 180 meters. ICW shall be defined as the type of wave produced by mechanically interrupting one or more of the radio frequency circuits or the type of wave produced by any transmitting set which produces an equivalent effect.

CW Transmitters

CW (Continuous Wave) transmitters will be permitted in all of the bands allocated for amateur use.

Coupled Circuits

Amateur stations must use circuits loosely coupled to the radiating system, or devices that will produce equivalent effects to minimize key impacts, harmonics and plate supply modulations, except in cases where loops are used as radiators. Conductive coupling, even though loose, will not be permitted. [Note 2.]

Power Supply

No restrictions will be imposed relative to the character of power supply, provided the emitted wave is sharply defined. [Note 3.]

Quiet Hours

Amateur stations when using wave lengths between 150 and 200 meters, are required to observe a silent period from 8 to 10.30 p. m. daily, standard time, and on Sundays while church services are being

broadcast. Such stations, when using wave lengths below 85 meters and having a pure continuous wave or where a full wave rectification is employed, are not required to observe a silent period, provided no interference is caused other service.

Station Licenses

Licenses issued for amateur stations will authorize the use of any or all of the wave lengths allocated for amateur use, provided the transmitter meets the requirements of the above regulations. No alteration in the apparatus will be permitted which results in changing the character of the emitted wave except under authority granted by the Supervisor of Radio.

Intercommunication

Amateur stations are not permitted to communicate with commercial or government stations unless authorized by the Secretary of Commerce, except in an emergency or for testing purposes. This restriction does not apply to communication with small pleasure craft such as yachts and motor boats, which may have difficulty in establishing communication with commercial or government stations.

Special Amateur Station Licenses

There being no further need for special amateur station licenses, owners of stations holding such licenses will be permitted to continue the use of their "Z" calls under regular amateur station licenses. No new "Z" calls will be issued. The privilege of using the wave lengths from 105 to 110 meters is withdrawn.

Our Notes

Note 1. The previous ruling was 0.2.

Note 2. Note that this applies to 150-200 meters also, and whether or not quiet hours are observed—a new ruling.

Note 3. There are no restrictions outside of quiet hours. If one wants to avoid quiet hours, the types of power supply specified in the paragraph "Quiet Hours" must be used between 8 and 10:30 p. m. and during Sunday church services.



3Z0, on 198 meters, worked N.Z. 4AG

Notes on Reflexing Receivers

By A. L. Budlong*

WRITING about something you don't believe in is always poor policy, so it is with mingled feelings that the author takes up the subject of reflex receivers.

Reflexing started with the French during the war, and has since attained a high pinnacle in the ranks of broadcast receivers. Under certain conditions the scheme possesses considerable merit, but, like everything else, the principle has been very much overdone, and certain types of reflex receivers, in my humble opinion, do not possess the advantages claimed for them.

Since space is limited, we will list rather briefly some of the various reflex combinations commonly resorted to, and an opinion of their desirability.

The One-Tube Reflex

1. When employing a single tube as R.F. and A.F. amplifier, a crystal for detection, and a "fixed" R.F. transformer, we do not believe this receiver is particularly valuable for any use. Our experience has been that it is "the bunk" for DX, and for local work several sets of this kind gave no noticeably greater volume than a straight crystal detector and single audio stage.

2. When a tuned transformer is used, as shown in Fig. 1, the set gains much in DX ability. The results on extreme distance are not better—or even as good—as

tube reflex using a single amplifier tube and tube detector instead of a crystal. (See Fig. 2). Using an untuned transformer, the set performs fairly well—especially on some of

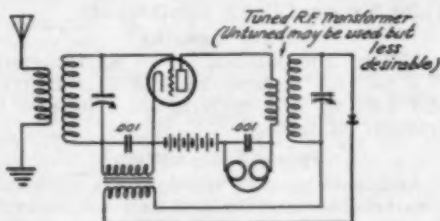


FIG. 1

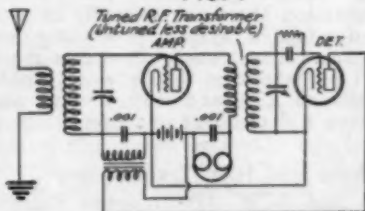


FIG. 2

the weaker signals that the crystal-detector set would not get. It is not strongly recommended with the untuned transformer, however.

2. Using a tuned R.F. transformer in this combination, the set is a mighty fine little receiver. Results can be very favorably compared to those obtained with a three-tube set employing one R.F. detector and one A.F.

3. Under this heading we will classify all reflex sets using two or more stages of radio frequency amplification. They are on the whole, very good performers, whether crystal or tube detector is used. Even with "fixed" R.F. transformers the results are worthwhile, although obviously better results can be obtained with tuned air-core transformers. A typical receiver of this type is shown in Fig. 2a.

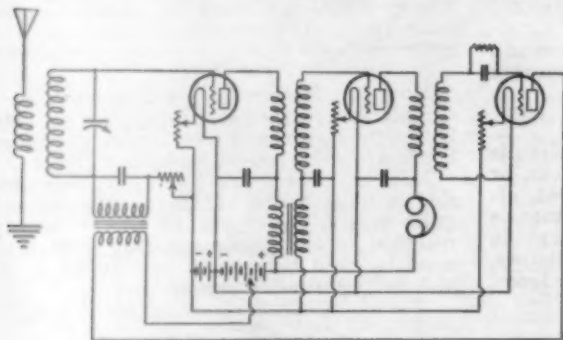


FIG. 2a THREE TUBE REFLEX

can be obtained with a straight regenerative detector. For fairly strong signals, however, louder reception is possible.

Multi-Tube Reflexes

1. First of all, we will consider the two-

*Experimenters Section, A.R.R.L.

Stabilizing Methods

The old reliable method of stabilization—i. e., prevention of oscillation in the R.F.

stages—is by the use of a potentiometer across the "A" battery, as shown in Fig. 3. Sometimes this is used only on the first stage; at other times the grid returns of

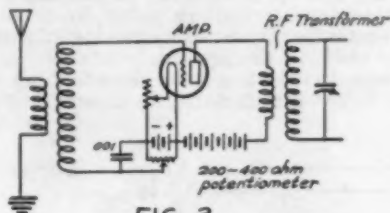


FIG. 3

All the R.F. tubes are brought down to the potentiometer arm. The former method is better for fixed transformers; the latter for tuned transformers. The method is not recommended for two reasons. First, the positive potential necessary for stabilization plays havoc with the life of the "B" battery; second, the positive potential doesn't help the audio quality in the reflexed audio stages. The series resistance shown in Fig. 4 is better. Our only objection to this is that it is critical to wavelength changes, and necessitates frequent adjustment.

Stabilization by reducing the number of turns in the primaries of the R.F. transformers is one of the easiest methods, but, in the opinion of the writer, one of the least desirable. Amplification falls off at the higher waves if the number of turns is kept low enough to prevent oscillation at the lower end of the scale.

Neutralization by the Hazeltine method has been tried and proves fairly successful

an upsetting of the balance and a tendency to oscillate.

A variation of the neutradyned reflex is the Harkness neutroflex. This is simply a reflex in which neutralization is obtained by the Kice system instead of the Hazeltine system. See Fig. 5.

Reflexing Standard Receivers

This article started with the intention of telling how to adapt reflexing to some of the more common types of receivers. All his other talk about reflex sets has been incidental. Now let's get down to business.

The Reinartz Receiver

One of the most common types of receivers now in use is the Reinartz. This is shown in Fig. 6a. In Fig. 6b is shown

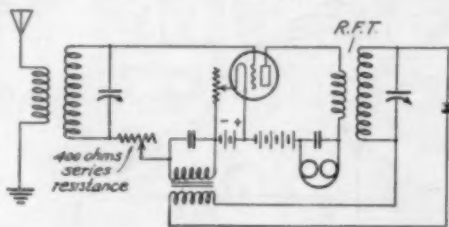
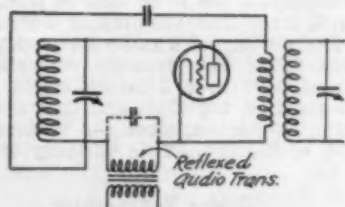


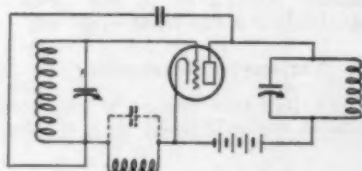
FIG. 4

how the first tube may be converted into an amplifier, a second tube added and used as a detector, and then the whole thing reflexed. Our Reinartz receiver isn't really a Reinartz any more, but it will work. For the 200-600 meter band the R.F. transformer is made by winding 60 turns of No.



"Counterflex" circuit developed
Nov. 1924 by Harkness.

(a)



Rice circuit published
in Jan. 1924 QST page 16
(b)

FIG. 5

in a single-stage reflex. Reflexing has been adapted to multi-stage neutrodynes, but we are inclined to the belief that they owe their "neutralization" more to small primaries in the R.F. transformers than to actual capacity neutralization. It is the opinion of Wheeler, and others, that reflexing a real neutrodyne would have had effects on stabilization, probably resulting in

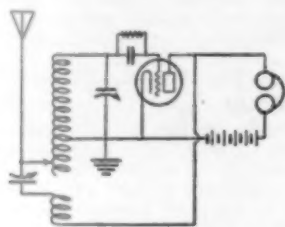
22 D.S.C. wire on a four-inch tube for the secondary, and winding 25 turns of the same size wire over the "low" end for the primary. Tuning of the secondary is effected by a .00025 μ fd. variable condenser. The audio transformer may be any ratio. Use a high ratio for code work, where quality is not an essential. For phone work use a transformer of not more than 5:1 ratio.

Reverse the connections to the feedback coil. Your feedback coil will not have a stabilizing effect, and may entirely prevent oscillation if properly adjusted. If it won't effect complete neutralization, you can avoid oscillation by keeping the R.F. tuning condenser below the oscillation point.

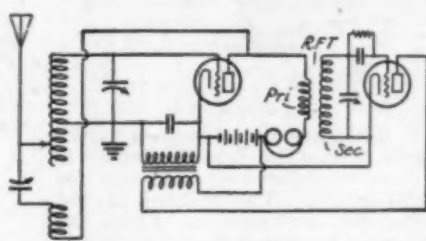
The grid condenser in the first tube must be removed, or short-circuited. While it is desirable also to bring the grid-return of the first tube back to the "negative" of the

in Figs. 7a and 7b. As stated before, we don't think much of one-tube reflexes with crystal detectors, but that is about all you can do with the variometer receiver. Of course, you can try a tube detector if you want to, but we don't want to mislead you into thinking that all is going to be love and roses when it comes to making it work. Better stick to the crystal.

A way in which a tube detector can be added fairly satisfactorily is shown in Fig.

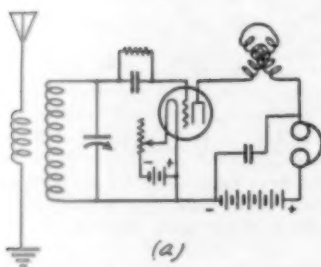


(a)

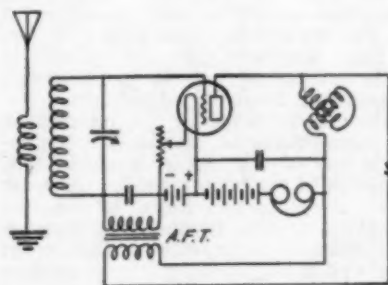


(b)

FIG. 6



(a)



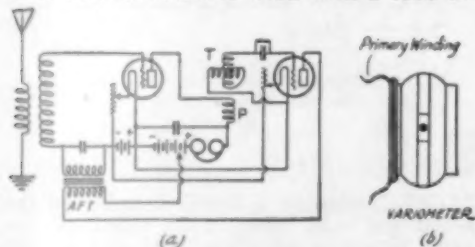
(b)

FIG. 7

"A" battery instead of to the "positive," it is not absolutely essential to do so.

Variometer Regenerator

We don't like this one so much, because it is hard to make it work with a tube de-



(a)



(b)

FIG. 8

detector. The thing has a beautiful tendency to howl. The only thing to do is to use a crystal detector. The changes are shown

8. The circuit has to be torn to pieces to do it, however. The variometer becomes the tuned secondary of a radio frequency transformer "T." The primary consists of 12 turns of wire in a 3½-inch circle. These turns are tied together, and then the whole winding is stuck against the variometer as shown in Fig. 8b. This winding is "P" in Fig. 8a.

Tickler Regenerator

The tickler type of regenerator is not particularly difficult to adapt to reflexing. Probably the best way of doing this would be to use a tuned transformer in the plate circuit in addition to the tickler, as shown in Figs. 9a and 9b. "A" shows the original circuit, and "b" the reflex. The tickler is connected up as a "reverse" tickler, and is used, as in the Miner superdyne, for an oscillation control.

A Neutrodyne Reflex

We now come to the last circuit, probably one of the best—a neutrodyne reflex.

Only one stage of R.F. amplification is used. In both this circuit and the tickler reflex previously mentioned the R. F. transformer is made up as follows: Primary, 25 turns of No. 22 D.S.C. wire wound over a secondary of 60 turns of the same size wire on a four-inch tube. The secondary is tuned with a 00025 μ f. variable condenser. The tap for the neutrodon connection in Fig. 10 is taken off the 30th turn of the secondary, the turns being counted from the "low," or filament, end of the coil.

With the large primary the neutrodon adjustment will be critical, but the results

short waves particularly seriously for the reason that reflexing involves R.F. amplification, and R.F. amplification on short waves is of doubtful value. Lately this particular phase of reception has received considerable impetus by the work of Magner, 6BCP, who worked two-way with Australia using the Roberts' reflex as adapted to short waves by Zeh Bouck. The Roberts' circuit is simply a neutrodyned one-stage R.F. amplifier, a regenerative detector, and a reflexed audio stage. Its principal value would seem to be that it results in a non-radiating receiver, and increased

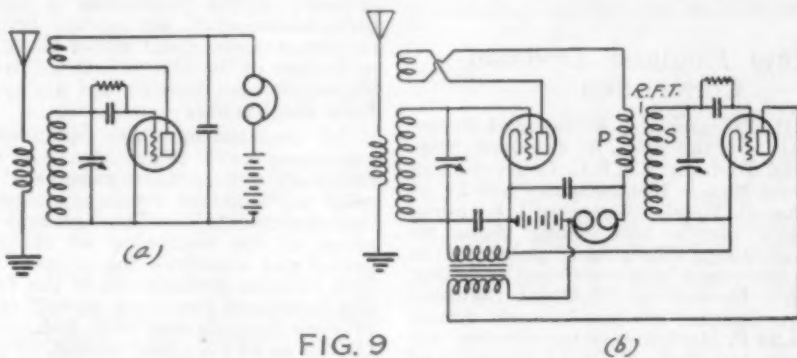


FIG. 9

(b)

will be worth the trouble. Browning and Drake have shown by recent experiments that a large-primary transformer gives noticeably greater amplification than a transformer with a small primary.

How Much "B" Battery

Some day, manufacturers, and the dear radio public also, are going to wake up to the fact that high plate voltage on R.F. amplifiers are the bunk. High voltages give better results on the strong signals, but not on the weak ones, which are the ones you want to get. A superheterodyne recently tested out gave best results on weak signals when but 22½ volts were used on the plates of the R.F. tubes. Higher than 45 volts is not recommended under any circumstances.

But in a reflex set, we use the tubes both as R.F. and A.F. amplifiers, and A.F. amplifiers must have higher voltages to make noise. This, of course, means that the R.F. end of the argument is at a disadvantage, which is another reason why we are not in love with this reflex business. However, we will concede some additional volts to the reflex amplifier tubes, solely and simply for the sake of the audio end.

Go ahead and use as high as 67½ volts on the reflex amplifier tubes—darn it!

Reflexing on Short Waves

The writer does not take reflexing on

selectivity through the introduction of additional tuned circuits.

Since reflexing involves complications, the advantages of the receiver could more easily be incorporated in a set employing a neutrodyned amplifier, regenerative de-

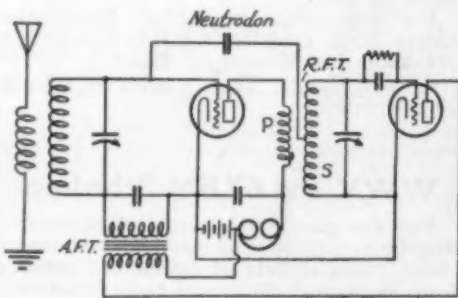


FIG. 10

tector, and straight audio amplifier. A set of this type has been built and operated by Don Wallace, 9ZT, and was described in the January issue of QST.

While on the subject of R.F. amplification it might be mentioned that so far no short-wave receiver employing R.F. amplification (including the superheterodyne) has demonstrated an ability to get greater distance

than a single oscillating-detector-and-one-stage-audio low loss tuner. Signals are brought in louder; we get more noise, perhaps—but the DX ability of the simple oscillating detector is yet to be improved upon.

To be sure occasional impassioned articles are written on some new super-sensitive low-wave R.F. amplifier set that has been developed, but it is significant that a few months later, in the majority of cases, the R.F. set is lying in the corner, and a low-loss regenerator is doing the work on the operating table.

New England Division Convention

APRIL 3rd and 4th, Friday and Saturday, are the dates of the New England Division A.R.R.L. Convention in Worcester, Mass. Headquarters will be at the Bancroft Hotel. There will be many worthwhile events and among these we might mention: Technical Meetings on Friday afternoon and Saturday morning; Operator's License examinations Saturday morning; Banquet at the Bancroft Saturday at 6.30 P. M., followed by speeches, notably one by Prof. Hobart Newell of Worcester Polytechnic Institute on "Radio from the Standpoint of the Broadcast Listener", movies and R.O.W.H. Initiation.

Especially thought has been given to making this convention attractive to the radio experimenter or broadcast listener, even though he may not own a ham transmitter. He will find much of value and interest awaiting him.

For reservations or further information address N. E. Division A.R.R.L. Convention, 274 Main St., Worcester, Mass.

All out, Gang! This is going to a bang-up convention.

WWV and 6XBM Schedules

For the past two years the Bureau of Standards has been transmitting at stated times, radio signals of standard frequency from Bureau of Standards radio laboratory at Washington, D. C. These signals are transmitted approximately twice a month and have been utilized throughout the eastern half of the country. In order to extend the territory covered, transmitting equipment and standards have been installed at Stanford University, California, with the cooperation of that institution. The station thus established at Stanford University on September 5 inaugurated the transmission of similar signals of standard frequency, thus duplicating in the West the

service rendered by the Bureau of Standards in the East.

The frequencies included in the past transmission have been from 125 to 2000 kilocycles (2400 to 150 meters). In order to make the transmissions of still greater service, they will be extended to include frequencies up to 6000 kilocycles. The future transmitting schedules which have been definitely arranged are given below.

These special signals of standard frequency are of use to testing laboratories, transmitting station operators and others in standardizing wavemeters and adjusting transmitting and receiving apparatus. The accuracy of the frequencies is better than three-tenths of 1 per cent. Information on how to receive and utilize them is given in Bureau of Standards Letter Circular No. 92, which may be obtained on application from the Bureau.

All transmissions are by unmodulated continuous-wave telegraphy. A complete frequency transmission includes a "general call," a "standard frequency signal," and "announcements." The "general call" is given at the beginning of the 8-minute period and continues for about 2 minutes. This includes a statement of the frequency. The "standard frequency signal" is a series of very long dashes with the call letters (WWV or 6XBM) intervening. This signal continues for about 4 minutes. The "announcements" are on the same frequency as the "standard frequency signal" just transmitted and contain a statement of the measured frequency. An announcement of the next frequency to be transmitted is then given. There is then a 4-minute interval while the transmitting set is adjusted for the next frequency.

The schedule of standard frequency signals from both the Bureau of Standards and Stanford University is as follows:

Schedule of Frequencies in Kilocycles (Approximate wave lengths in meters in parenthesis)

*Time	Mar. 5	Mar. 20	Apr. 6	Apr. 20
10:00 to 10:08 p.m.	300 (1000)	550 (545)	1500 (200)	3000 (100)
10:12 to 10:20 p.m.	315 (952)	630 (476)	1650 (182)	3300 (91)
10:24 to 10:32 p.m.	345 (869)	730 (411)	1800 (167)	3600 (83)
10:36 to 10:44 p.m.	375 (800)	850 (353)	2000 (150)	4000 (75)
10:48 to 10:56 p.m.	425 (705)	980 (306)	2200 (136)	4400 (68)
11:00 to 11:08 p.m.	500 (600)	1130 (265)	2450** (122)	4900 (61)
11:12 to 11:20 p.m.	600 (500)	1300 (231)	2700** (111)	5400 (55)
11:24 to 11:32 p.m.	666 (450)	1500 (200)	3000** (100)	6000 (50)

*Eastern standard time for WWV, Washington, D. C.
Pacific standard time for 6XBM, Stanford University, California.

6TS and 2MU First Across on 40 Meters

ON the evening of Friday Jan. 2nd, William H. Schick of 2MU at Brooklyn, New York, heard 6TS at 40 meters. Having put in many hours in logging harmonics and tracing their causes, Schick did not suppose that this was 6TS's main wave. However the next evening 6TS was again heard calling and saying "40 meters". 2MU thereupon went after him and at 7.00 P. M. (E. S. T.) received an answer.

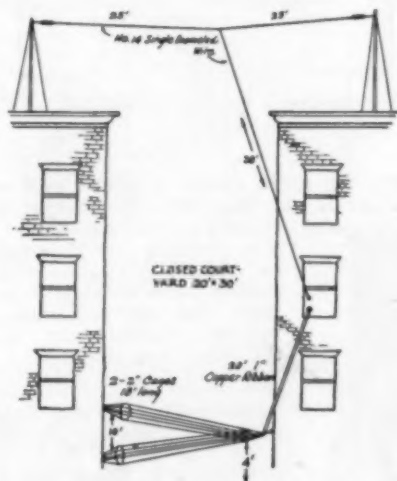
Good two-way communication followed at once. Details are lacking at this time but it doesn't really matter—we know the main fact, that 40 meters got across and that these two did it.

That isn't all, the power at 2MU was only about 95 watts!! That isn't so bad when one considers that it was 4 P. M. in Santa Monica.

2MU has worked every district except the 7th with the same set and the same power, therefore the station will be described briefly.

The Transmitter

The set uses the good old reliable Hartley circuit—the thing that works anywhere

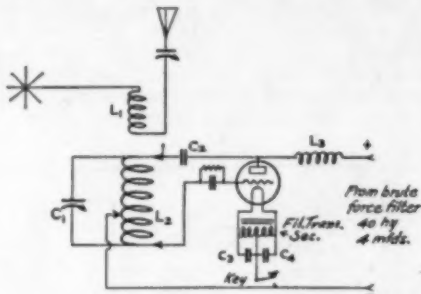


ANTENNA AND COINTERPOISE AT 2MU

from 1 meter wavelength to 1 cycle per second. There isn't anything new about it and that is just the beauty of the thing—it shows the difference between the man who does his best with what he has—and the rest of us that camp up on 80 meters and don't try to do anything new.

The antenna is fully explained by the

drawing. Notice that it is in anything but a good location, the counterpoise of necessity being very short. These things do not



THE TRANSMITTING CIRCUIT AT 2MU

- L1—Antenna coil, half of an R.C.A. helix.
L2—Primary coil, inner coil of an old Murdock helix.
The spacing of the 6 turns has been increased to reduce the distributed capacity and the eddy losses. The spacing is now $\frac{1}{8}$ " , the coil diameter 4".
L3—R.F. choke, 18 turns No. 24 on a 4" tube.
C1—Cardwell receiving condenser, set at about 100 micro-microfarads.
C2—Stopping condenser, .002 microfarads.
C3 & 4—Filament bypass condensers, exact size makes no difference, but those used have capacity of 1 microfarad each.
Grid leak and condenser are the usual sort.
A single 50-watt tube is used with an input of 95 milliamperes at 1000 volts.

discourage an amateur that amounts to something.

We hope to describe 6TS a bit later—perhaps we can make it in this issue, the pictures are coming by airplane.

COMING—A. R. R. L.
NATIONAL CONVENTION

The Third National A.R.R.L. Convention will be held in Chicago, under the auspices of the Chicago Radio Traffic Association, on August 19th to 22d inclusive, 1925. Everybody who attended earlier national conventions knows what a good time this means. This one will be bigger and better than ever. Mr. W. E. Schweitzer, 9AAW, the president of the C. R.T.A., at 4264 Hazel Ave., Chicago, is again Convention Chairman, to whom correspondence should be addressed. Full particulars will appear in *QST* as plans develop. Save your money and plan on attending!

The Deresnadyne

By E. F. Andrews and E. A. Beane

It is realized that there have already been many classifications of radio frequency amplifiers but in view of the fact that we only understand by comparison, another may not be out of place. At any rate, the public should not be allowed to continue in the error that any set which can blow our five tubes at once must necessarily be a

transformer-coupled tuned radio-frequency amplifiers. The signal to be amplified is impressed on the grid circuit GL-GC, causing a potential difference between G1 and G2. This energy is amplified by the tube in the well-known way, resulting in a greater energy in the plate circuit PC-PL and a greater potential difference between P1 and P2.

This would be a very simple, effective and stable process, were it not for the very strong tendency for some of the energy in the plate circuit to be transferred back to the grid circuit through the capacity between the grid and the plate. The condenser MC represents the natural capacity between the grid and the plate of the tube. The voltage at P1 forces a flow of current through this capacity to G1, thereby tending to make the tube oscillate.

Magnetic coupling may also exist be-

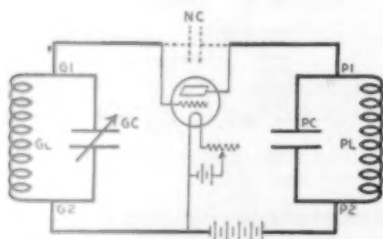


FIG. 1

neutrodyne. It is the purpose of this article to suggest another classification of tuned radio frequency amplifiers and to show in what respect they differ.

Preventing Self-Oscillation

There are three main methods of preventing self-oscillation. The oldest is the use of the so-called "losser" which is simply a device to absorb energy from the grid circuit. The second is the neutralization of the feed-back energy by an equal and opposite energy. In the third class come those methods which depend on preventing the building up of voltages which will cause

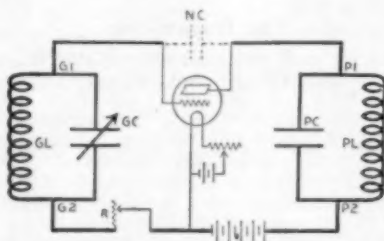


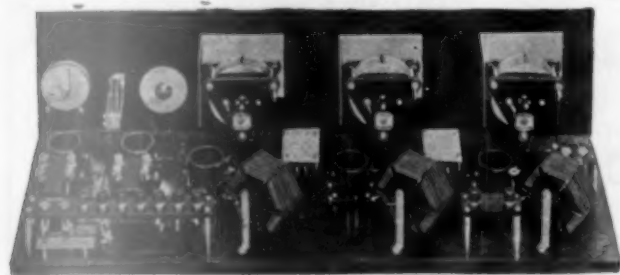
FIG. 2

tween the plate circuit and the grid circuit. It is not impossible to prevent this magnetic coupling but it is very difficult. In the circuit as shown, oscillations once started have nothing to stop them and self-oscillation is present continuously until the tubes are shut off.

Self-Oscillation and Relay Amplification

If the grid circuit and the plate circuits are tuned so that they are resonant to the same frequency, the tendency to oscillate is much greater because the instantaneous potential difference between P1 and G1 is greater and more energy is transferred to the grid circuit.

By tuning the plate circuit and grid circuit both to the frequency of the signal being received, we would get the maxi-



THE ANDREWS-BEANE DERESNADYNE

self-oscillation. These schemes are used in the "Deresnadyne" receiver.

Cause of Self-Oscillation

Before taking up the three methods we shall briefly consider the cause of self-oscillation. Figure 1 shows a vacuum tube connected in the fundamental circuit of all

imum radio frequency *relay* amplification were it not for the fact that self-oscillation commences considerably before exact resonance and maximum amplification are obtained. This makes it necessary for us to sacrifice some of the amplification which we would otherwise obtain in order to prevent self-oscillation, which, when it occurs, destroys the tone quality of our signal entirely. No matter what method we use for preventing oscillation, it has the effect of limiting the radio frequency *relay* amplification. The tendency to oscillate consti-

absorption circuit coupled to the grid circuit. Each of these systems produces the desired effect by increasing the losses. This prevents oscillation even though considerable energy is being transferred back to the grid circuit from the plate circuit as has been explained. The resistance used in one of these methods is indicated by R in Figure 2. The lossier method has the pronounced disadvantage that its adjustment is critical and changes with wavelength, also that in some forms it causes the tuning to become much broader.

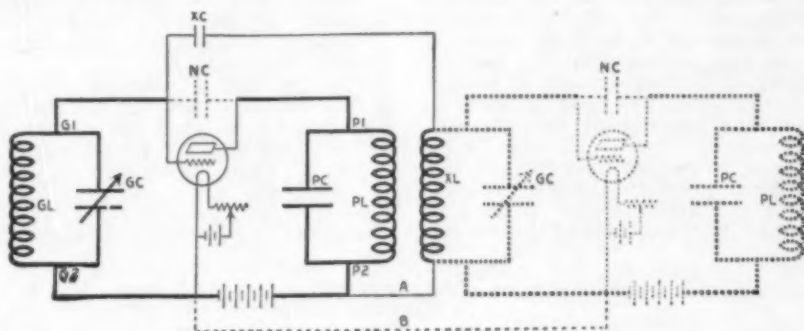


FIG. 3

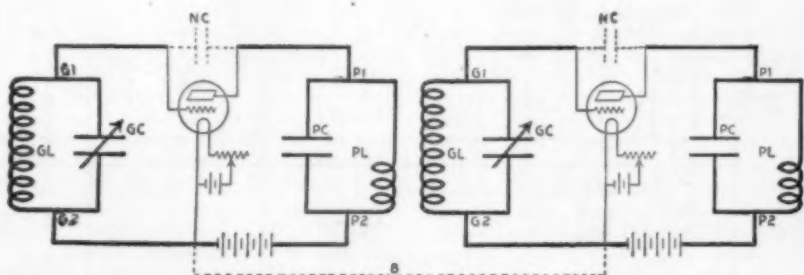


FIG. 4

tutes the limiting factor of radio frequency amplification. If tubes could be made without grid-plate capacity much higher amplification could be obtained. More tubes might be required but the amplification and stability would be well worth it.

The First Method of Stopping Oscillation

Now that we have considered self-oscillation in general, we may take up the first method of preventing it which consists of increasing the losses in the grid circuit. This scheme is usually known as a "lossier". The losses can be introduced in many ways; by a potentiometer to change the bias of the grid; by a variable resistance in the grid circuit (either shunt or series) or by an

Neutralization Methods

The most popular form of the second method is the neutrodyne circuit popularized by Professor Hazeltine. There are other methods of neutralization, such as the Rice circuit and the reversed tickler employed in the commercial superdyne set. However we will confine ourselves to the neutrodyne as the most important representative of this class. In Figure 3 the fundamental circuit of one stage of a commercial neutrodyne is shown in heavy line, while the dotted line represents the second stage. Neutralization is accomplished by the coil XL and the condenser XC. It should be noted that the coil XL in the com-

mercial set constitutes the secondary of the radio frequency transformer whose primary is the coil PL. XL is the grid coil of the succeeding tube which is shown (together with its circuit) in dotted line. In commercial neutrodynes the connection A is absent, this connection being made through the A battery bus B which connects all stages together. In this circuit, as in those previously described, the voltage difference between P1 and P2 is allowed to become great enough so that the transfers of energy through NC to the grid circuit would produce oscillation if not checked. This checking is accomplished by the coil XL which is coupled to the coil PL in such a way that a voltage is built up across it opposite to that across PL. By varying the capacity of XC an amount of energy is transferred through it just sufficient to neutralize that transferred through NC. If there are more turns in XL than in PL then XC must be smaller than NC and vice versa. When properly adjusted this receiver does not oscillate over a band of wavelengths. In the opinion of the writers,

circuits previously described in that means are provided to limit the voltage which will be built up between P-1 and P-2. This purpose is accomplished by reducing the number of turns in the primary of the coupling transformers and by another method which will be described later.

It would seem at first thought that the method of reducing the plate turns is so very simple that it cannot present any intricate problem. All that need be done is to determine the proper number of turns to put in the primary of the transformer and oscillation troubles are over. Unfortunately this is not the whole story for the tendency to oscillate changes with the wavelength of the signal being received for several reasons.

First, at low wavelengths more energy is transferred at a given voltage from the plate circuit to the grid circuit through any coupling which may exist between them.

Second, since the number of plate turns is small the plate circuit will approach resonance only at the short wavelengths. The closer to resonance, the higher the vol-

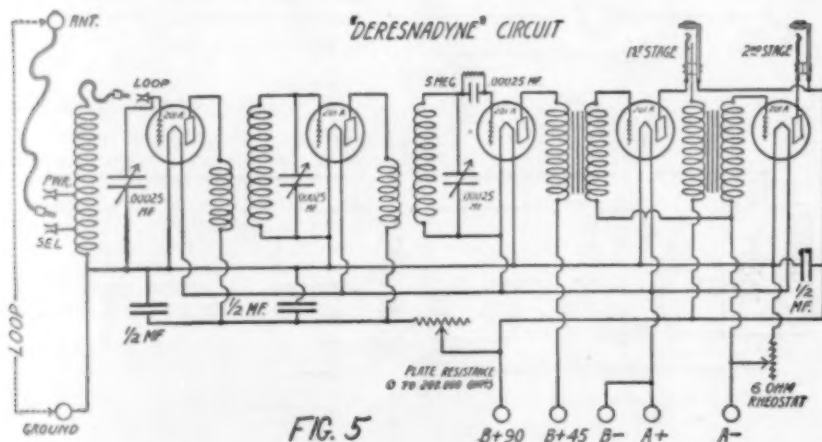


FIG. 5

opposing the increase in tendency toward oscillation when passing to a lower wavelength is the principal merit of the neutrodyne.

The Third Method

This brings us to the consideration of the third method of preventing oscillation in tuned radio-frequency circuits. This third method includes the various means which can be used to limit the radio-frequency voltage which can be built up in the plate circuit and thereby to avoid an amount of feed-back through the tube capacity which will be sufficient to cause oscillation.

The fundamental circuit is shown in Fig. 4. Its operation differs from that of the

tage across the plate circuit and the greater the tendency to oscillate.

Third, there is more transfer of electro magnetic energy through a given coupling at higher frequencies therefore the secondary is more effective in increasing the inductance of the primary and in bringing it near to resonance.

1. There is room for argument here. It is exceedingly hard to prove that the oscillatory condition depends on actual resonance. It is equally hard to prove that when one prevents oscillation by reducing the primary turns, that this is because one has detuned the plate circuit. It is entirely likely that the reason is merely a reduction of coupling between the primary and the secondary circuit, which is known to be effective in such cases.

There are several ways of equalizing conditions so as to secure maximum amplification without oscillation over a wavelength band. In fact, the circuit can be made to oscillate at the high wavelengths and not at the low wavelengths if that is desired. One means of securing this effect is to so place the transformers that there is a slight negative electro magnetic feedback from the plate circuit to the grid circuit of the radio frequency tube. This transfer of energy increases at lower wavelengths and can be made to offset, in a measure, the increase in tendency toward oscillation at low wavelengths. In this way fairly uniform amplification over the entire wavelength band may be obtained. Another possible method is to reduce the number of turns in the primary of the transformer still lower when tuning in low wavelength stations. This may be done by a double arm tap switch changing simultaneously the number of turns in the primaries of the two radio frequency transformers but this scheme unfortunately causes a "jog" in the tuning scale. Still another way of accomplishing this is by changing the position of part of the primary turns with relation to the other parts.² A further method of controlling the primary inductance is by varying the effect of the secondary inductance upon it by varying the coupling between the primary and the secondary.³

We have found it convenient to refer to such controls as "deresonators". Their purpose is to secure maximum amplification without oscillation over the wavelength band to be covered. Some types of deresonator control are suitable for attachment directly to the shaft of the tuning condenser so that the circuit is controlled automatically as the tuning is changed.

Another very effective way of controlling the tendency toward oscillation is by adjusting the B battery voltage by means of a series resistance control. The circuit is shown in Figure 5. The resistance R has a maximum value of about 200,000 ohms and is continuously variable to a zero resistance. The resistance may consist of a fibrous strip impregnated with a graphite compound. A disc rocking over this makes good contact at any desired point. The effect of this resistance is to vary the voltage applied to the plates of the two radio frequency amplifying tubes. Lowering the direct plate voltage reduces the instantaneous voltage differences between the plate

and the grid, thereby preventing oscillation.⁴ It is important to notice that this resistance is *not* in the radio frequency circuit and therefore does not increase the damping of the surface, in other words it does not broaden the tuning. The two large by-pass condensers lead radio frequency current from the primary of the transformer directly back to the negative filament of each tube respectively. The resistance also is a very nice volume control.

The general principles herein outlined are the subject of several patent applications.

Regarding NKF

WE HAVE the following in the form of a notice from the U. S. Naval Research Laboratory at Bellevue, D. C.

"All regular test schedules from NKF will be temporarily suspended. NKF will be on the air until 2 a. m., handling traffic with London, San Francisco (NPG), Balboa (NBA), San Diego (NPL) and Pearl Harbor (NPM) on 71.5 meters.

"Special tests may be arranged on request to NKF, before 8 p. m. or after 2 a. m.

"New schedules will be started before long on a different set of wavelengths. When these schedules are started, you will be notified.

"You will be interested to know that the 54.3 meter set has been converted into a crystal controlled set on 54.7 meters and will be sent to the Pacific Fleet; it is expected that it will go with a portion of the Battle Fleet to New Zealand and Australia. During this trip it will be available for work with amateurs at practically all times. It is sincerely hoped that a representative of the A.R.R.L. who is also a Naval Reserve Officer, will make the trip in charge of the set."



2. This is the scheme used in the "Super-Zenith" which was described in QST for November, page 28.

3. This is the scheme used in the "TRF" set.

4. It seems reasonable that this effect is due to the change in the plate-grid impedance which occurs when the plate voltage is changed. This change is in the right direction to account for the decreased tendency to oscillate when the plate voltage is reduced.

A good Wavemeter

By John M. Clayton and L. W. Hatry

THE requirements of a wavemeter are accuracy and ruggedness. A wavemeter consists of a tuned circuit containing a variable condenser, a fixed coil and an indicating device. The goodness of your wavemeter, then, depends on the condenser and the coil—the indicating device does not matter so much.

The variable condenser must, first, be well built and, second, low-loss. The plates should be heavy, well spaced, and very firmly bound together with large-surfaced separators and husky supporting rods. The

The tuning condenser used in this meter is a General Radio type 239 of 1000 $\mu\text{f.}$ capacity. The critical tuning on the short waves due to the capacity of the condenser can be taken care of by substituting a dial for the small knob usually on the vernier control. In fact, for precision, it will be difficult to get a better arrangement than obtainable with the extra dial on the vernier; particularly if this dial is one of the 360 degree type of which there are a number on the market at present. The 1000 $\mu\text{f.}$ condenser's advantage is that it required if a smaller condenser were used.

For accuracy of measurements, shielding the inside of the wavemeter box and the back of the supporting panel, is practically a necessity—especially at the short waves. It is surprising the amount of detuning which will occur through body capacity if the meter is not shielded carefully. The shielding in this case being made of 25 gauge sheet copper in the form of a box with soldered seams for the inside of the case of the wavemeter, and a flat sheet for the panel. The panel shielding is held on by mounting screws of the meter, etc. The edges of the copper box are bent over the shoulder to which the panel is screwed, and



THE COMPLETED WAVEMETER

bearings must be metal, should have no play in any direction, and should be substantial and smooth-running. Cone bearings, in particular, are good. A geared vernier becomes a necessity on the shorter waves or with high capacity condensers.

The coil must be non-changing in its constants which are inductance, resistance, and distributed capacity. The last two named should be kept low. To accomplish these things the coil form should be strongly built, the coil tightly wound and the wire bound so that the position of the turns can not vary; and the coil terminals firm and non-changeable in their relation to each other.

Since the wavemeter was built to use more than one coil, all wavelengths from about 15 meters up can be covered. It is ruggedly enough built to withstand the abuse of ordinary use without much damage to its calibration. Despite the inaccuracy of buzzer excitation, the buzzer on the meter has proved its value for rough checking numberless times. However, the buzzer can be left out.

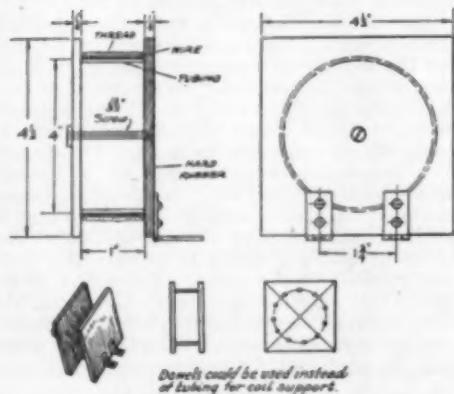


FIG. 1 DETAILS OF COILS FOR WAVEMETER

to these edges the panel shielding makes contact when the panel is in place. This shielding is connected to a binding post, on

the panel, which is connected to ground when the meter is in use. Thus the instruments in the meter are completely shielded so that there is no capacity effect to the hand, and no pickup of energy by the wiring or instruments of the meter.

The indicating instrument is a 100-milliamperere full-scale-reading hot-wire galvanometer. A thermo-galvanometer would be preferable because of its greater sensitivity, and because it would stand a much greater overload without burning out. With a hot-wire instrument it was found possible to read to the 9th harmonic of an oscillator, whereas with the thermo-couple it was found possible to read to the 15th harmonic of the same oscillator wave at the same power.

The window used for viewing the back-of-panel dial is made by drilling a hole in the panel and backing it with a piece of mica or celluloid with an indicating line scratched on the

cording to Fig. 1. A six inch diameter would be better because of the larger field of that size of coil which permits you to get a greater distance from the oscillator

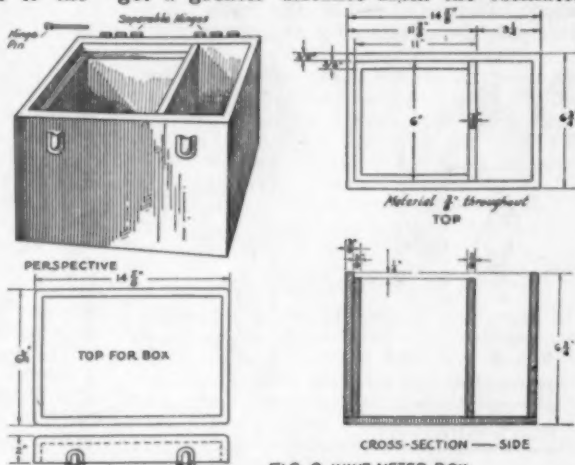
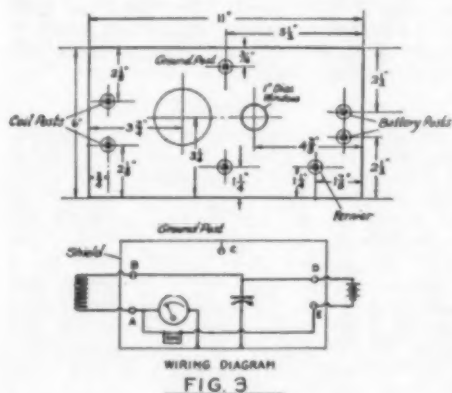


FIG 2 WAVE-METER BOX

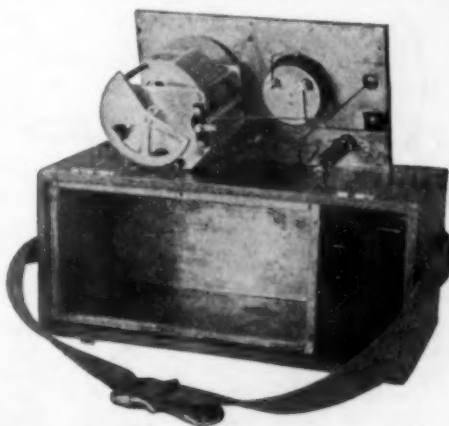
or other source of energy whose wavelength is being measured. Also it would undoubtedly be convenient to have a plug mounting on the coil that would permit of its rotation without the necessity of having to move the entire wavemeter. The position of the wavemeter coil in relation to the source to which it is coupled has a direct bearing on the energy being picked up. A



back and filled with india ink. The window in the panel should be larger than the one shown.

The back-of-panel dial is a General Radio 4" diameter one without the knob and fitted with a special bushing according to Fig. 5. Care must be used in centering this bushing. The shaft of the condenser was cut-off enough to avoid touching the panel. The knob removed from the dial is large and an excellent one to use on the vernier with a bushing to make it fit the 3/16" shaft.

The coils for this meter are made ac-



THE "WORKS" OF THE WAVEMETER

manner in which a plug mounting might be constructed is shown in Fig. 4. While it is true that such a method of mounting is not low-loss, we believe its convenience

overshadows that objection. Another advantage is that Fig. 4 only requires standard parts and is easy to construct for that reason. The winding of the coils themselves may be done easily and conveniently

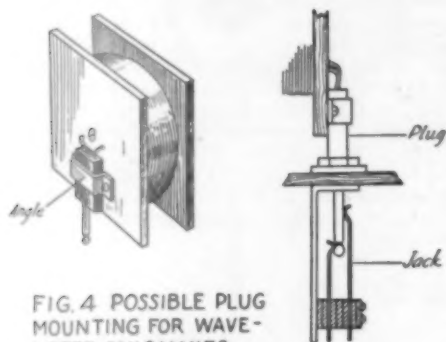


FIG. 4 POSSIBLE PLUG MOUNTING FOR WAVE-METER COILS MAKES COILS ROTATABLE

by using wire of a size to completely fill the form width with the number of turns to be used. The article entitled "Amateur Wavemeters" in the Feb., 1924, issue of QST, on page 22, gives a great deal more useful information on wavemeters and their coils, so be sure and read or re-read it.* After the wire is wound on the coil form it

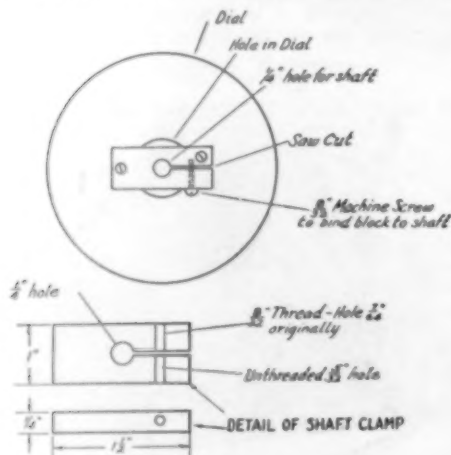


FIG. 5

should be covered with a thick layer of waxed shoemaker's thread to exclude moisture and to make a permanent coil.

The coils used with this meter are as follows: A single turn of $\frac{1}{4}$ inch copper tub-

ing eight inches in diameter, which gives a wavelength range of 15 to 62 meters; a coil of 5 turns of No. 12 D.C.C. with a range of 40 to 110 meters; a coil of 13 turns of No. 14 D.C.C. wire with a range of 65 to 264 meters; a coil of 31 turns of No. 22 D.C.C. with a range of 140 to 650 meters.

On a 100 degree condenser scale, the useful portion is from 10 to 90, and on a 180 degree scale, from 15 to 165.

You will notice from the wiring diagram in Fig. 3 that any instrument in the meter can be taken off from some pair of binding posts, independent of the others. The variable condenser off of posts B and C. The Galvanometer off of A and C. The buzzer off of A and E. You should preserve this feature in the wavemeter you build, merely as a matter of convenience.

The top of the wavemeter box could have a handle in place of the webbed strap used. The hinges are the type with removable pins so that the top can be completely removed when the instrument is being used—this is a really convenient feature. The corners of the box should be protected with metal, as shown in the photographs.

It has been suggested by a number of the gang that the small Pyrex pudding cups make excellent lead-in insulators when a couple of them are used with a brass rod passed through holes in the bottoms.

To change micromicrofarads into microfarads divide by 1,000,000; e.g., 500 micromicrofarads is .0005 microfarad. In other words, put enough naughts to the left of the figure to go left six places with the decimal point; e.g., 1000 micromicrofarads is .001000 microfarad; and the last three naughts can be erased. To reverse the process you add naughts after the figure sufficient to allow you to point off six places to the right; e.g., .002 microfarad is 002000 micromicrofarads and you erase the first two naughts.

Please do not ask us to send QST or any League supplies unless you enclose cash, check or money order. The League would lose money if it was compelled to send bills—hence a cash business. This, of course, means that radio orders will not be accepted.

While we are on the subject—the Information Service will not pay any attention to radiograms and telegrams except when they contain a request for reply by collect telegram. The Information Service rules require a stamped and addressed return envelope. Other wires and radiograms will land in the wastebasket. Sorry—but isn't it fair?

*Also Part Two of the same article in the April 1924 issue on page 20. Both issues of the magazine can be obtained from the Circulation Department at 20 cents.

A Tuned Audio Transformer

THROUGH the courtesy of Mr. R. A. Braden* we present herewith a tuned amplifying transformer for C. W. receivers. The work was done in the radio communication laboratory, Engineering Dept., Univ. of Minnesota as a part of the course conducted by Prof. C. M. Jansky, Jr. Further work is being done.

First of all one might as well review the needs of an audio amplifier used in C. W. work for the purpose of making clear just why a sharply tuned transformer is wanted.

Good for Phone, Rotten for Code

Here of late all the labor of audio transformer designers has been toward getting

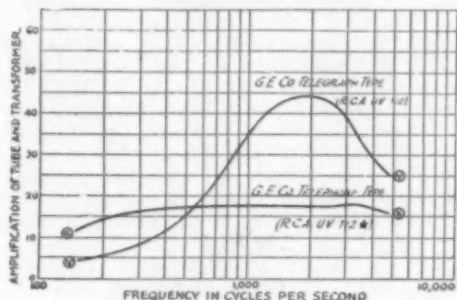


Fig. 1

a transformer that would amplify all frequencies equally because in broadcast reception it is desirable that the base drum be reproduced as faithfully as the piccolo. Putting it differently, they are working for a transformer that is as good at 16 cycles per second as it is at 1000 or 6000 cycles. The result of such work is illustrated in Figure 1. The peaked curve represents the old General Electric Company amplifying transformer which had a ratio of 9 secondary turns to one primary turn. This transformer was designed to work on ship receiving sets that were copying 500-cycle spark which make a 1000-cycle tone in the receiving operator's headset. It is a good transformer for the purpose, in fact one of the *very best* that has ever been generally available. It goes without saying that this transformer was also good for C. W. reception, where the beat note is usually set somewhere near 1000 cycles.

The lower curve represents the new General Electric Company transformer known as the "Star". This transformer does not amplify nearly so much at 1000 cycles but it is much better at the low frequencies and has a beautifully flat curve — if one

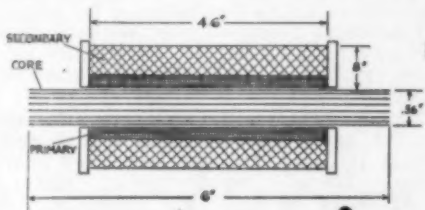
is interested in amplifying music. A most unfortunate blunder has been made by the Radio Corporation in marketing this transformer under the same catalogue number as the old one. This has led to much confusion, misunderstanding and hard feelings. Let us therefore repeat, the *first* transformer is excellent for code and rotten for music, the *second* one is excellent for music and absolutely putrid for code work. The new type is marked with a star stamped on the case. If you are a code man look for this and avoid it.

Amplification Without Noise

The old type of transformer not only amplified better at 1000 cycles where code work is done but in addition was much more quiet and did not let so much static through. The reason for this is that static is mostly low-pitched and comes in where the amplifying transformer is not good. Interference from 60-cycle plate supply, much caused by boiling rectifiers and sparking "sinks" doesn't come through nearly as well. Therefore this "peaky" sort of transformer is a good thing and the idea can be carried further. This is what is done in Mr. Braden's transformer.

The Braden Transformer

The Braden transformer is made as shown in Figure 2. The primary consists of 35,000 turns of No. 36 S.S.C. copper wire. The secondary winding of 50,000 turns of No. 36 S.S.C. copper wire. There



TUNED AMPLIFYING TRANSFORMER.

Fig. 2

is no insulation between the layers of the windings but a certain amount of care should be taken not to have some turns get badly below where they belong. A single layer of Empire cloth between the primary and secondary will prevent trouble.

The core is of iron wires 6 to 7 inches long and of 20 or 22 guage. Enough are used to fill the insulating tube on which the primary is wound and the transformer is tuned to the desired audio frequency by sliding the core in and out, also by reversing the secondary connections.

* Experimenters' Section, A.R.R.L.

Performance

The performance of the transformer is shown by the curves in Figure 3. The curve marked F is that of an ordinary 10 to 1 amplifying transformer and is seen to be much like the one shown in Figure 1 for the old General Electric transformer. The numbered curves show the performance of the Braden transformer. Curves 1, 2 and 3 show the tuning effect gotten by moving the core out gradually. Curve 4 shows the effect of putting the core clear in and reversing the secondary connections (inside end of secondary to grid). Mr. Braden modestly says "Although the tuning of this transformer is quite sharp, it is not sharp enough to be of much benefit in a C. W. receiver". However, we are much

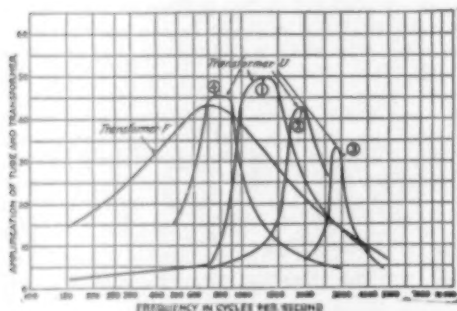


Fig. 3

more hopeful about the transformer. The difference between it and the ordinary 9 to 1 is fully as big as that between the old and new General Electric types. Without doubt the new transformer is very much more quiet which is an extremely desirable thing.

Mr. Braden says: "Two stages of amplification using two of these transformers should be used (to get increased sharpness). There is no danger of "ringing" or of fuzzy signals. The phone may be shunted to reduce the signal strength to the desired value."

The Experimenters' Section will be very glad to hear of results secured with these transformers. One warning should be made however, they are of open core construction and will need to be well spaced apart inside the set.

American amateurs should see to it that they have sufficient postage on postcards and letters that they send to the foreign amateurs. If they don't, the foreign amateur has to pay the postage due which is certainly an injustice. This is occurring often at the present.

Pacific Division Cops Two Trophies

As previously reported in our columns, 6BCP won the boomerang offered by the A.R.R.L. to the first North American amateur to connect with Australasia, and 6CGO, Glen A. Litten, of Orange,



Calif., won the Chilean hat offered by Major R. Raven-Hart, of Los Andes, Chile, to the first North American to work Chile. Both prizes have now been forwarded to the winners and it is our privilege to present photos and a brief description of each.

6BCP's boomerang is made of polished three-ply mahogany, 22 inches across the tips, 3 1/4 inches wide at the center, bearing



an inlaid silver plate 3 by 5 inches on which is engraved:

TO W. B. MAGNER, 6BCP, SAN PEDRO, CALIFORNIA
IN COMMEMORATION OF THE FIRST TWO-WAY AMATEUR RADIO COMMUNICATION WITH AUSTRALASIA, WHEN 6BCP WORKED 4AA, F. D. BELL OF WAIHEMO, NEW ZEALAND, ON THE 20-21 OF SEPTEMBER, 1924.
AMERICAN RADIO RELAY LEAGUE

6CGO's hat is woven of native Chilean grass in two colors, cream and a chocolate brown. It has a fore-and-aft length of about 14 inches, a beam of about 13, and a crown about 4 1/2 inches high. The ribbon and cord have dark reds and blues as the predominating colors. It is a beauty.

Renewed congratulations to the west-coast gang are in order, and we offer ours.

As a memento of the Dakota Division Convention, the Twin City Radio Club presented Don C. Wallace of 9ZT with an A.R.R.L. emblem for his watch chain.

Learning the Code by Listening

A Long-Wave Tuner For the Broadcast Listener

HAVE you ever wondered what "this code stuff" was about? It isn't hard to find out and there's endless interest in it after that. There are plenty of times when radiophone broadcasts get monotonous, but there's never a time when there isn't endless variety and entertainment in the dots and dashes.

Where the Charm Comes In

Have you ever noticed that after a while even a 7-tube broadcast receiving set has reached its limit—there isn't anything more to accomplish? When you have logged stations all over the United States—Canada, Cuba—perhaps a few in Europe—that's all, there isn't any more.

Not so with the telegraphic signals, you can log them with a *single receiving tube* and yet never come to the end of the possibilities. Up at 17,000 meters there's the steady whistle that wavers up and down in the form of dots and dashes, that's NSS, the naval station at Annapolis, Maryland. A bit further down is a fainter signal from YN at Lyon, France, which works at 15,100 meters, and still a bit below that are KET at Bolinas, California, (13,345), WII at Chatham, Mass. (13,600), NPM at Honolulu (11,490), WSO at Marion, Mass. (11,600), POZ at Nauen, Germany (12,000)—but why go through the long wave-band? They are scattered all over the world and can all be heard over amazing distances, for these stations are built for daily transoceanic work and the talk that goes between them is of national and international interest. Some of them speak slowly and droningly—as if designed for the beginner—others race along with machine-sending at such furious speeds that the words become bursts of sound and sentences are mere buzzes. No man can copy such matter, but there are machines that attend to it and make tape records. These are the stations above 5,000 meters.

Next below that there are great groups of somewhat smaller stations; the Federal

Telegraph string that handles messages up and down our western coast, the United Fruit string that furnishes gilt-edge communication over Central America and the Gulf of Mexico, our Navy Yards that mostly sign calls beginning with NA, NP, or NG (depending on their location on the Atlantic, Pacific or Gulf Coast), the Postal and Army stations that sign a variety of calls and handle much of their traffic in weird cryptic terms that the rest of us cannot understand. These stations are in general between 5,000 and 1,200 meters.

Then comes the biggest group of all—the almost countless shipboard stations and the great system of shore stations that work with them. If these stations are American they will be working above 600 meters, usually between there and 2600 meters. If they are foreign they are likely to

be working anywhere—including the 450-meter wave right in the center of the broadcast band. Many a time American stations are damned for horrible noises that actually come from an ancient spark set on board a British, Spanish, Italian or French ship that is just off our coast. Here again—wouldn't it be interesting to be able to make sure who he was and where he was?

Then there is a blank—600 to 200 meters contains

practically no radio telegraphy, but below that there are signals aplenty, all the way down to 5 meters—and they come from every civilized country and from a few others to boot.

But——

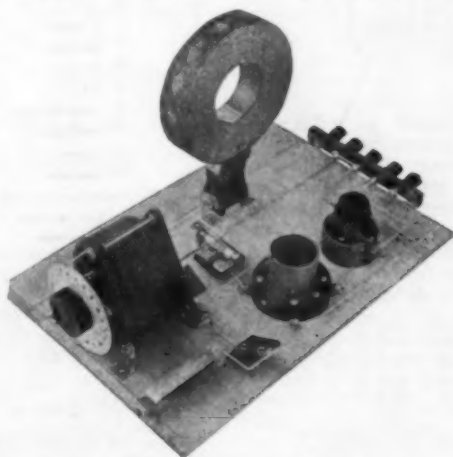
Yes—that's pretty fine—but what good is it unless I know the code?

Oh pshaw—the world is full of folks from 15 to 75 who have learned it—why can't you?

The answer is—you can learn it, and here's how.

How to Learn

There are several ways to learn. Possibly the best way of all is to start in with someone that can send well with a key and buzzer, and have that person spend a lot of



THE LONG WAVE RECEIVER

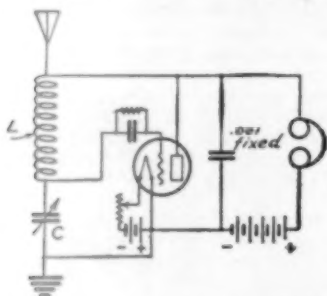
time teaching you. This is all right if he has nothing else to do but to wait until you happen to feel like taking a lesson—but there's the rub.

The next best way is to listen to the slow-moving long-wave transatlantic stations, for they are ALWAYS sending, and you can take a lesson when you want it.

The listening can be done with the simplest set in the world, and now we will discuss that.

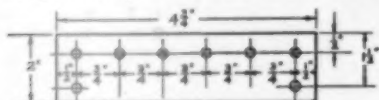
The Simple Long-Wave Receiver

The set is (we hate to admit it) a "single circuit" affair. It isn't single circuit for



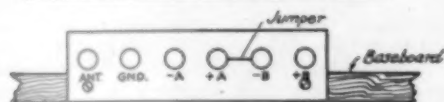
any reason except that such an affair is cheap and easy to make and plenty good enough for code practice. The diagram, photograph and list of materials explains the whole business, nothing more is needed, hook up the set, turn on the filament and tune in NPL or WSO—then start spoiling paper and pencils.

If you keep at it the dots and dashes



NOTE—Size of drill to agree with type of binding post used.

TERMINAL BLOCK SEEN FROM THE BACK OF SET



NOTE—Posts +A and -B are connected together as shown.

ARRANGEMENT OF COMPLETED TERMINAL BLOCK SEEN FROM THE BACK OF SET.

will begin to make words and sentences after a few nights, and after that you can start listening to the talk of the World instead of the United States alone.

And That Isn't All, Either

Of course you needn't stay on the long waves any longer than it takes to learn the code, after that you can drop down and

listen to the crisp, laconic, ship-to-shore conversations that go on at every port of any importance, you can hear the cryptic letter-group code of the Naval stations, and finally you can drop down and hear 9ZT at Minneapolis working other amateurs in 8 or 9 countries, or you can go clear down to 21 meters and hear the only John Reinartz working across the continent in broad daylight to Willis at Santa Monica, California, with a power that makes broadcast stations seem enormous.

Of course, the simple tuner shown here will not go down to 21 meters—but it will go down to the Navy-yard stations (1200-2600 meters) if you use a 300 turn honeycomb coil and it will get down to the ship-and-shore stations with a 100 or 150 turn coil. After that you are in Citizen radio, and that changes every 30 days, so we can't

A	—	N	—
B	—	O	—
C	—	P	—
D	—	Q	—
E	—	R	—
F	—	S	—
G	—	T	—
H	—	U	—
I	—	V	—
J	—	W	—
K	—	X	—
L	—	Y	—
M	—	Z	—
1	—	6	—
2	—	7	—
3	—	8	—
4	—	9	—
5	—	0	—

tell you what you will need by the time you have learned the code.

Come along and let's see that part of it together.

List of Materials

9 feet of tinned No. 14 tinned "bus" wire.

1 good variable condenser, having capacity of 1000 micro-microfarads (.001 microfarad). This set used a type 247-B General Radio Condenser, but the make does not matter.

4 brass angles to hold the condenser to the baseboard. 1/2" x 1"; angles may be obtained at the hardware store.

1 good socket, the set used General Radio type 156.

1 30 Ohm rheostat, the one shown is General Radio type 301.

One mica bypass condenser, capacity 1000 micro-microfarads, (.001 microfarads), the one shown being Dubilier type 600.

One mica (do not use paper) grid condenser with gridleak mounting. The one shown is Dubilier type 601, capacity 250 micro-microfarads, (.00025 microfarads).

One grid leak, resistance 2 megohms. Electrad or Durham leak recommended.

Electrad or Durham Leak Recommended

6-1 General Radio 138-W Binding posts or 6 8-32 roundhead brass machine screws with 2 hexagon nuts each.

One baseboard, 1 inch thick by $7\frac{1}{2}$ " x 12".

One rubber or bakelite strip 2" x $4\frac{1}{4}$ " x $\frac{1}{4}$ ".

One single jack, open circuit type, Carter or Federal can be obtained anywhere.

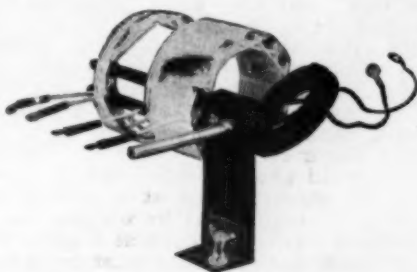
One single coil-mounting *not* pivoted.

One 1500 turn coil (5,000 to 15,000 meters). Other coils listed below. Screws, solder, etc.

The coil mounting and the coil can be obtained from Sears, Roebuck & Co., Montgomery Ward & Co., Charles Branstion, Inc., Buffalo, New York; The Coto Coil Co., Providence, R. I., or Remler Radio Mfg. Co., San Francisco. For the commercial ship and shore stations a 100 or 150 turn coil may be used, for the 1200-2600 meter stations a 300 or 400 turn coil is correct. A 750 turn coil will bridge the gap from 2600 to 5,000 meters, thus including the high-power shore stations.

A Neat Tuner Unit

AN especially neat tuner-unit has just appeared under the name of "Supercoil". The unit differs from most of those on the market in having the primary and secondary coils mounted, so that they will slide along two $\frac{1}{4}$ " bakelite



tubes. This does not add any controls to the panel but it does permit changing the primary-secondary and the secondary-tickler coupling so as to suit any antenna and any tube. We cannot enough stress the importance of such adjustments—they make the difference between a smooth-working set and a miserable, cranky thing that howls at some wavelengths and is "dead" at others. "Supercoil" takes care of this difficulty without adding controls to the panel—one "sets and forgets" the couplings.

Lorenz-type coils have been used. This may worry some of us a trifle but the designers have used the self-supporting feature of the Lorenz coil to permit the use of a most beautifully simple mounting in which there are no losses other than those in the coil itself. Furthermore they have provided a two-screw mounting so built that it is impossible to ruin a good tuner by jamming it against the panel of the set. Of course if a metal shield or panel is used one can still spoil things if one does not provide a 3 inch space, but the coil designer can hardly be expected to take care of that.

"Supercoil" is made by the Perfection Radio Manufacturing Co., of Philadelphia. Normally it is built for the broadcast range of 200-600 meters but the construction permits the easy removal of turns if one wishes to drop to lower waves.

LPX is an LPZ experimental station. Wave around 58 meters, and a compensated keying wave.

CB8 uses that call for international communication. DA8 is used by the same station for local phone.

Rules Governing the A. R. R. L. Information Service

1. Before writing, search your files of QST. The answer is probably there.
2. Do not ask for comparisons between advertised products.
3. Be reasonable in the number and kind of questions you ask.
4. Put your questions in the following form:
 - A. A *Standard Business Size* stamped, self-addressed envelope **MUST** be enclosed. No stamp required from foreign countries.
 - B. Write with typewriter or legible ink on one side of sheet only.
 - C. Make diagrams on separate sheets and fasten ALL sheets together.
 - D. Number each paragraph and put only one question in a paragraph.
 - E. Keep a copy of your letter and diagrams.
 - F. Put your name and address (NOT merely call letters) on each sheet.
 - G. Please don't go off in a tantrum if we refer you to a back issue of QST which contains the information you want. Quite obviously we cannot typewrite reprints of articles which appeared in issues which are obtainable from the circulation dept.
5. Address all questions to Information Service American Radio Relay League, 1045 Main Street, Hartford, Conn.

Circumventing the Locals

By Philip G. Schermerhorn

AT a radio dealer's recently two ardent BCLs were engaged in an animated conversation. They were both evidently of the type who "roll their own", and they were comparing the merits of their pet receivers. One boasted to the other, with rather carefully modulated pride—considering how manifestly pleased he was—that his latest set was "so extremely sensitive that it could bring in all the locals without any aerial or ground whatsoever".

If we will be honest with ourselves, most of us will admit that we have been guilty of the same brag, or at least experienced a pleasant thrill of satisfaction when his own receiver has continued to bring in the locals after both antenna and ground leads had been disconnected.

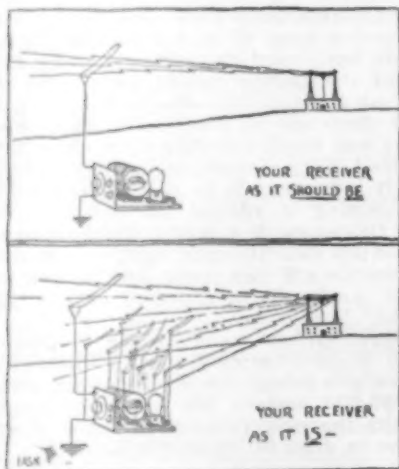
It was a brag of this sort however which set the writer thinking and which finally led him to the conclusion that a receiver which does bring in the locals, without the agency of any regular antenna or ground, is a good deal like a house with a very leaky roof—and that properly we have no more reason to be proud of the one than the other. If we are fortunate enough to own a house we naturally want to have running water in it. If it is led in through

without the use of aerial or ground is in the same class with a leaky roof. In either case we are getting something in a way not under our control and pretty certain to spoil something.

Consider for a moment what we have to contend with in attempting to bring in a DX station with a receiver which is normally capable of rendering local programs with ample volume, without either aerial or ground. In the first place, if we are angling for DX it is to be presumed a conventional antenna of some sort is connected. In that case such antenna is responsive to both local and distant signals. Coincidentally, the various inductances, wires, etc., inside the receiver are acting as collectors of energy, yet while they are highly responsive to local signals, they are to all practical purposes, quite unresponsive to the distant ones.

A good aerial is much like an active puppy; it brings in everything it can pick up. Fortunately however, the numerous signals reaching our aerial are of different frequencies, else the Tower of Babel would be outdone; and because modern broadcast tuners are designed to differentiate between frequencies differing by 10 or 20 kc., it is usually possible to select whichever one we desire. The engineers who have developed our modern tuners have doubtless based their calculations upon theoretical circuits and conditions wherein the electrical energy transmitted from a distant or nearby station would be collected only by a conventional antenna and thence led to, and throughout the receiving circuit, in a perfectly definite course and orderly manner. Excellent examples of such efficient circuits may be found in any back number of QST. Upon examining such a diagram, the first symbol to meet our eye is the familiar inverted triangle which indicates the aerial which receives and conveys the radio frequency impulses to the receiver. Everything which follows the aerial circuit, receives its energy from it, and from nowhere else. It isn't customary to sprinkle several other little triangles, indicating other, or supplementary sources from which energy is intended to be received; nor to show connections from them directly to inductances, transformers, or other places, because no energy is supposed to enter the circuit, except at the input end.

It is perhaps just here that the engineers are at fault for actual operating conditions are not usually so ideal. In practice a great deal of energy does reach our re-



the service pipes and can be turned on and off at will at the several outlets, that is perfectly satisfactory—but if it just pours in through the roof every time it rains . . . well at least we do not brag about it!

It seems to the writer that reception

ceivers by uncharted paths. Since no provision has been made to handle such outlaw currents they run riot in the set, create chaos, and cause a lot of trouble generally. This brings us back to our BCL's boast, for it is obviously just such outlaw reception which he impulsively regards as an *accomplishment!*

It would seem therefore that our chances of bringing in any particular DX station, would be decidedly better if we could entirely eliminate "stray" reception.

Before any success can be expected in this direction considerable laboratory research work must be undertaken. Up to the present the main line of attack has been rather centered upon eliminating losses and, although much valuable data have been tabulated concerning efficient coil and condenser design, which of course is very necessary since we wish to conserve every scrap of the millionth-of-a-fly-power (or whatever it is) that our antennas pick up, little or nothing has been done which contributes to our knowledge of the ways and means of *preventing* interference which enters the receiver by other means than via the aerial.

This opens up a new field for serious investigation and, paradoxical as it sounds, if we knew more about keeping strong signals OUT, we would doubtless be better able to bring *weak* ones IN. Perhaps the so-called "binocular coils" introduced by A. H. Grebe & Co. is a step in the right direction. At any rate it is certain that ordinary inductances, such as conventional secondary coils, function excellently as miniature loop antennas; and there would be no need of any other type of collector if broadcasting stations were more powerful. Hence it naturally suggests itself that attention should first be directed to the coils of our receivers, with the object of developing a type which would respond efficiently to *conducted* energy, yet remain practically unresponsive to helter skelter, broadside, bombardment.

It would be absurd for the writer to attempt to suggest offhand how this problem should be approached, much less solved; but the idea of a coil which is responsive to currents entering at one point yet remains unresponsive to other currents traversing it is not new. The special relays used in duplex telegraphy are examples of this principle, although the problems involved are very different from those encountered in radio.

All that can be said, however, is that certain preliminary experiments conducted by the writer seem to indicate the successful solution of this problem would result in much greater selectivity and that success is to be looked for along the lines

of specially designed coils rather than by means of any conventional metallic shielding.

Aside from laboratory developments, this problem should provide a new interest to those who delight in experimenting with receiving circuits and, as a novelty, what can compare with trying to develop a set which would bring in DX with the best, yet become as silent as the Sphinx the moment aerial and ground are disconnected? Success is well worth trying for since, if attained, most of the difficulty of circumventing the locals might be solved.

Florida Convention

THE Florida A.R.R.L. amateurs held their first get-together in Orlando, Jan. 1st, 1925, with the Chamber of Commerce as their headquarters. Hams from all parts of the state responded and made the convention a big success, although it was planned but one week in advance. This is an example of what a live bunch of hams can do in a short time.

The morning was devoted to the annual rag-chewing, registering and receiving delegate badges.

The afternoon program included contests, a visit to 4XE, where the delegates' pictures were taken and refreshments served.

After taking in 4XE's various short wave sets and antennas, the gang assembled at the private dining room of the Hotel San Juan for the banquet. Over twenty active amateurs from all parts of Florida were present. A good feed was had, then talks on various traffic subjects were given by 4XE, 4IZ, 4UA, 4FS, 4QY and 4EZ. The president of the Orlando Radio Club gave an address of welcome on behalf of the Club and the City of Orlando. A.D.M. 4EZ brought up the CQ question and was promised the support of every ham present in upholding the League's CQ regulations. A sum of money was also raised and turned over to A.D.M. 4EZ toward the I.A.R.U. delegate fund.

After the banquet, many valuable prizes, donated by local dealers and enthusiasts, were awarded to the contest winners. Every one had a real time and went home with new enthusiasm for Ham Radio.—4EZ.

Dutch 0LL (Zero LL) requests that call cards be sent to him protected by an envelope. The use of the envelope is a good idea in sending cards to those countries where amateur transmission is forbidden;—such as Holland and Denmark. Be certain that sufficient postage is used,

Experimenters Section Report

OUR 20-meter tests served to make a striking public demonstration of the value of 20-meter waves for daylight work and also of their utter worthlessness at night.

The 5-meter tests were not so successful, because everyone depended on someone else

tests on this same wavelength. If space is available in this issue of *QST* for an article on 5-Meter Sending Sets the tests will also be announced in this issue, otherwise they will be carried over. Meanwhile all members of this section are urged to put together a 50-watt oscillator (at least) which will operate at 5 meters and below. It is not at all difficult to do this if one will only leave off the needless things and make the circuit simple. Almost any standard circuit will serve.

The Eclipse Tests

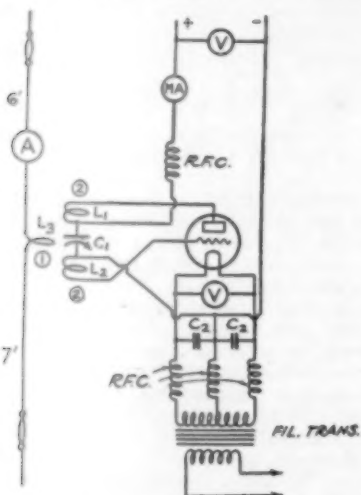
Few returns have arrived for the eclipse tests which were arranged for this section by Dr. Greenleaf W. Pickard, hence the main report must be made in the next issue. In general it seems that the 75-meter signals of 2XI were weaker and steadier during the eclipse, but that many remote 75-meter stations came through with almost night-time intensity. No reports are as yet available on the 240 meter special broadcasts nor the higher wave broadcasts.

Problems Needing Attention

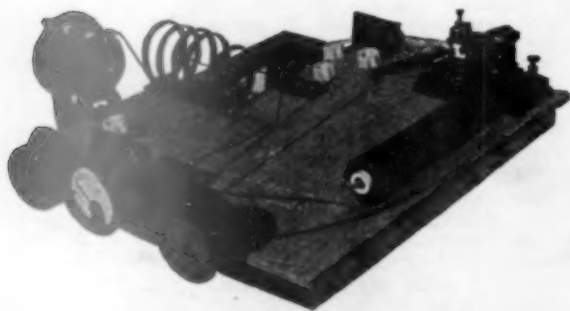
Problem T-18, "Filtering Synchronous rectifier output" is in urgent need of attention. Most of the synchronous rectifiers now in use are absolutely criminal and should be taken out of service immediately. We have in mind 15 stations whose plate supply is so truly awful that they can be heard for distances up to 1000 miles with a non-oscillating detector tube, the tone being that of a very rough spark. The local interference with broadcast reception can be imagined. Most of the offenders are located in the 2nd, 3rd and 6th Radio districts.

At this writing this department has investigated 9 stations which were claimed to have a "perfectly filtered" synchronous rectifier, and so far but one has been found that would stand scrutiny. The other 8 were all going on evidence from distant stations using oscillating detectors.

Problem T-11, "Harmonics of tube transmitters" needs attention almost as badly. Most amateur stations today can be copied as well on their half-wave and almost as well on their third-wave as on the fundamental. They are not as bad as radiophone stations (most of whom have beautiful har-



5 METER TRANSMITTER AT 6CNC.



THE 5 METER TRANSMITTER AT 6CNC

- L1, L2 & L3, all wound of copper ribbon (flatwise, not edge-wise) to a diameter of 3". Number of turns marked on coils in circles.
 C1—General Instrument Co. 250 micro-microfarad variable receiving condenser used as variable bypass condenser.
 C2—Bypass condensers. 1000 micro-microfarad mica condensers.
 R.F.C.—Small Lorenz coils used as R.F. chokes, each with 35 turns of No. 28 D.C.C. wire.

to do the sending, therefore all hands were listening for signals that were not being sent. The few sets that were in operation were of too low power to be heard very far. We shall therefore have to run more

monics down to the 5th) but they are bad enough.

Problem T-8 "Effect of different plate supply on the Range" is being neglected by the men that have signed up for it. This is important as we must soon improve the plate supplies of all sending stations if a general shut-down from 6 P. M. to Midnight is to be avoided.

Problem S-1, "Battery Substitutes for Receivers" should be gone into by all members of the section who can investigate any of the devices now on the market. Laboratory work is not essential—the results in actual reception are as important. However—use a headset, not a loud speaker. Prompt reports to this section will be greatly appreciated.

The Static Problem

With the appearance of the McCaa anti-static devices we should see renewed activity amongst the men working on problem G-4. Reports on both the tube devices and the band-device are wanted.

Correspondence

For the tenth time it becomes necessary to remind members of this section that letters **MUST** be addressed "Experimenters Section, American Radio Relay League, 1045 Main Street, Hartford, Conn."

Please do not address them to any particular person.

Letters asking for information that has nothing to do with the problems you are working on should go to the Information Service—and of course must follow the rules of that service; they are printed in each issue of QST.

New Problems

Suggestions are invited as to new problems for the section. They must have general interest—there is no point to listing something that only one person is interested in. Therefore problems will not be added unless several write about the same thing.

Dead Problems

Several of the problems now on the list will probably be dropped because they have been worked out or because radio has changed so as to make them needless.

New Membership and Problem Lists

A new membership and problem list is being prepared at this time (Beginning of February) and will be mailed soon. It will be differently arranged so as to be shorter than the old list and just as useful.

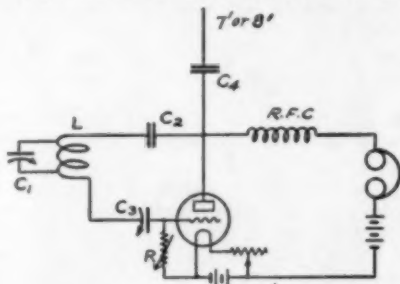
Please Write More Carefully

We have just had to wastebasket 6 requests for admission to this section. Two of them were sent in unsigned, one was on a postal card and had been smudged until it was unreadable. Two others gave no address and the remaining one was too badly written for even "D.M.S." to unravel—and she is the puzzle expert of this office. If the Experimenter's Section is worth working on isn't it worth a letter and a bit of care? Thanks.

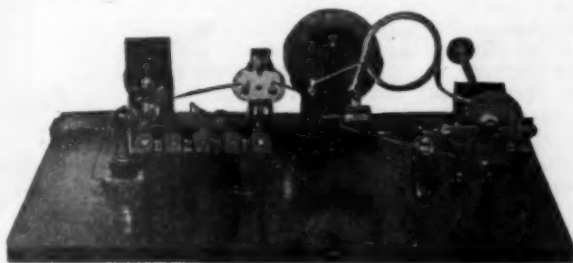
6CNC—A Beautiful 5-Meter Station

Although only a small set, the transmitter at 6CNC owned by Harry J. Lyman of Venice, Cal., is so constructed as to give a variety of excellent suggestions for 5 meter work.

The photograph has arrived too late for the required retouching, hence the diagram



RECEIVER AT 6CNC



THE 5 METER RECEIVER AT 6CNC

- L—3-turn self-supported coil, spaced helix type, diameter 3".
- C1—Tuning condenser shunting two of the three turns. The condenser is a Remler 500 micro-microfarad condenser that is rebuilt so that the plates are $\frac{1}{4}$ " apart when wide open.
- C2—Mica fixt condenser, capacity 250 micro-microfarads.
- C3—Regeneration condenser—3 plates.
- C4—Antenna coupling condenser, two lengths of wire, 2" long spaced $\frac{1}{4}$ " apart.
- R.F.C.—150 turns 36 enamel on $\frac{1}{4}$ dowel pin.

and a bit of description are needed. By the way—we would not have gotten the photo at all except for being able to request it by 20-meter daylight radio via the famous 6TS-1XAM route.

Looking at the foto one has first the

three ammeters. The one farthest to the left is the plate voltmeter, the series resistance for it being inside the tubular "shell" at the right of the picture. At the center is the filament voltmeter and to the right is the plate-circuit milliammeter.

The 4 small R.F. chokes will be recognized as being similar to those described in Beekley's 1XAQ-1AEL 5-meter set which appeared in *QST* for October. The coils have 35 turns of No. 28 D.C.C. wire. The telegraph sounder is used as a magnetic key, cutting the common lead in the usual fashion.

The circuit is either a series-feed Hartley or else a Meissner circuit—depending on the importance of the tube capacities in tuning the primary circuit. Since the variable bypass condenser tunes the primary it is probable that the action is that of a true tuned Hartley primary, rather than the shock-excitation that we associate with the Meissner system.

The antenna system is suspended between two glass rods and is vertical. When the plate voltage is 550 and the plate current a trifle above normal the antenna current is $\frac{1}{2}$ ampere.

Since such an antenna system gains a great deal by being in the open away from wiring and house walls it has been suggested that an untuned "link circuit" be used between the primary and the antenna. Frank C. Jones of 6AJF has operated such a line successfully, on various waves as low as 1.5 meters. The transmission line (link circuit) consisted of a pair of No. 18 wires spaced 4" and provided with a single coupling turn at each end. One end of the line was coupled to the set, the other to the antenna system. Details will be given in the next issue.

Returning to 6CNC—the set shown has worked to 6TS at 2 miles but at that distance fading was very severe although the signal strength was excellent. Mr. Lyman was unfortunate enough to make the discovery that a Weston thermo-galvanometer should not be left near a 5-meter set—not even when there is nothing connected to it.

The receiving set did not work immediately as did the sending set, but took 3 weeks of work. The circuit is a descendant of the old DeForest "Ultraudion". The use of a variable gridleak has been found necessary. The set will operate at very low waves (below 1 meter) if the coil is reduced to a single turn. For 5-meter work a 3-turn coil is used with two of the turns shunted by the Remler variable condenser which has been "operated on" to increase the spacing, the two sets of plates now being $\frac{1}{2}$ " apart when set at the position of lowest capacity.

The Uncle Sam Tuner

THE New Uncle Same tuner, made by the Uncle Sam Electric Co. of Plainfield, New Jersey, is a nicely-executed example of the reliable "loose coupler with a tickler". The best comment on this class of tuner is that it continues to hold its own in the face of all new developments. Partly this is so because it also has undergone development of the sort shown in the tuner now being described.

The primary and tickler windings are of litzendraht, both on skeleton hard rubber frames. The secondary is on the same frame with the primary, fairly loose fixed coupling being provided. Fortunately the secondary is NOT wound with litz, but with good reliable solid wire with blue double-silk covering. Thus the pretty but untrustworthy "litz" is kept in those circuits where a broken strand will do no harm, and the secondary is kept safe from such accidents.

By the way—the "Uncle Sam" idea is carried out by making the primary red, secondary blue and tickler white.

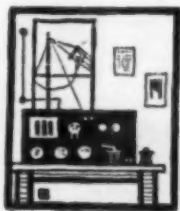
Honest-to-goodness binding posts are provided and the designer has had the good sense not to bunch them together. Each winding ends in terminal lugs which



are clamped under the posts. The tickler winding is small (therefore does not have a large detuning effect) and is carried by a full-grown $\frac{1}{2}$ " shaft in good bearings.

In our photograph the secondary winding has been removed so as to show the construction of the tuner more clearly. It ordinarily occupies the space between the primary and the shaft of the tickler.

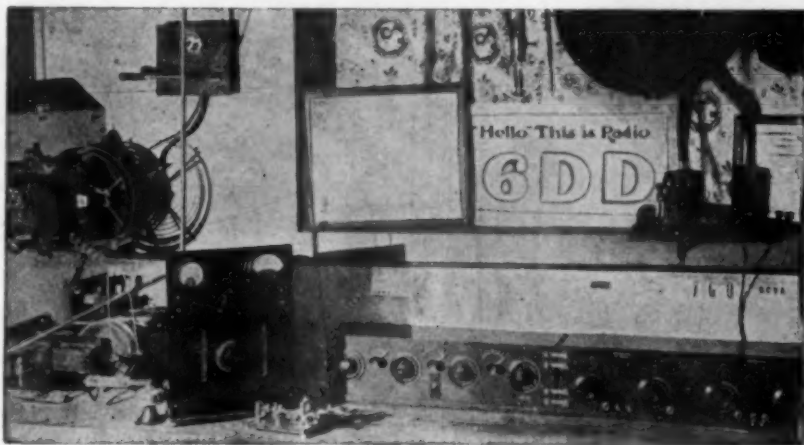
India 2BG is the station of G. W. G. Benzie, Urrunabund Tea Estate, Udaband P. O., Cachar, India. Mr. Benzie has heard 1AAC and 2BRB. This makes another new country on the air.



Amateur Radio Stations



6DD, Grass Valley, Calif.



6DD is the station of Phil Keast at Grass Valley, Calif. It has been heard in Mexico, Cuba, Alaska, Hawaii, Australia, New Zealand, in addition to all over the U. S. and Canada. It is also an O. R. S.

The transmitter uses the inductively-coupled reversed-feedback circuit with two fifty-watt tubes. The plate voltage is supplied from a 1000-volt motor-generator and the filaments from the usual transformer. A chopper is used for I. C. W. and a magnetic modulator for phone. The key is in the grid circuit shunted by a one "mike" condenser. The set is used on the 75- to 80-meter band at present.

The receiver is a Radio Shop 100- to 24000-meter tuner. A conventional type of low-loss receiver is being constructed for the shorter waves.

The aerial is a 12-wire vertical cage 63 feet high. The counterpoise is 90 feet long and 50 feet wide, 8 feet above the ground. The ground system is of the buried wire type, using about 7000 feet of No. 9 copper wire. Porcelain insulation is used throughout the antenna system.

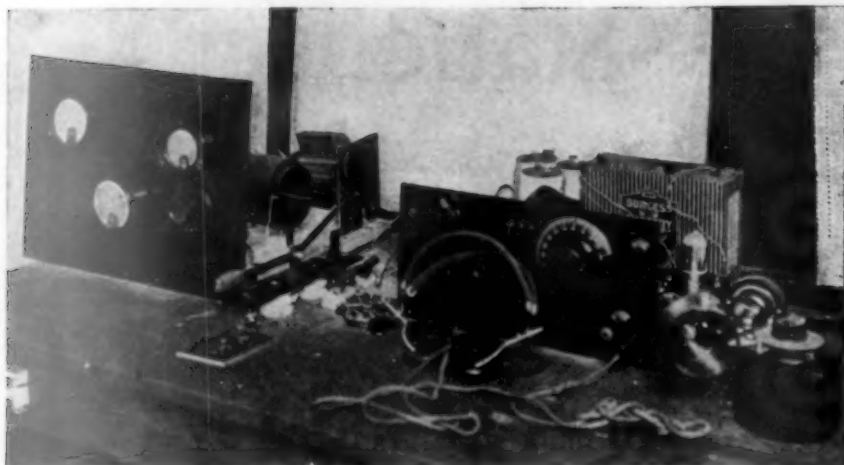
6DD says that he does considerable re-

ception on the long waves listening to European and U. S. transatlantic stations. This proves to be both interesting and good code practice.



EVER BEEN INSIDE OF
A MODERN RADIO-FACTORY?

9BMX St. Paul, Minn



9BMX is the station of Leonard Still who holds an O.R.S. certificate and is City Manager of St. Paul.

The antenna is a four-wire semi-vertical cage sixty feet long used in conjunction with a five wire fan counterpoise that is forty feet long.

The receiver is of K. E. Hassell's design

as described in *QST* with the secondary mounted on small plugs so that it might be changed. A step of audio amplification is used.

The transmitter uses the three coil Meissner circuit with a condenser tuned plate circuit. A so-called five-watt tube is used with sixty watts input.

2SZ, London, England

2SZ of London will be remembered as the first British station to connect with New



Zealand. It is the station of C. W. Goyder at Mill Hill School, London, N.W.7.

The receiver is a low-loss tickler regenerative of the usual type, with one-step of audio amplification, the combination usually used in DX work.

The aerial is a five-wire inverted L type on twelve-foot spreaders. The lead-in is a cage 45 feet long. The transmitter uses the inductively coupled Hartley circuit and a 250-watt input Mullard tube. The plate voltage is the essential difficulty because the British tubes are of such high impedance that 2500 volts are required to get an input of 250 watts. Originally a "sink" rectifier was used alone but now it is used in conjunction with a rectifier tube as shown in the accompanying diagram. The "sink" by itself could not be successfully filtered, but once the tube was used it was possible to filter the output of the combination and obtain a good note. The plate and filament voltages are supplied from transformers and a 240-volt A.C. supply.

The Canadian Section

Edited by A. H. K. Russel, 9AL, A. R. R. L. Canadian General Manager

Inauguration of Canadian Section

With this issue of our magazine, we are starting what is known as a Canadian section and through the kindness of the editor of QST we are enabled to have three pages of the magazine for our own use every month. Naturally the material to fill this section must come in from the members and if the material is not forthcoming the section must be abandoned. It therefore, is up to everyone of you to get busy and write to the Canadian General Manager a report of all Canadian news of interest, stories of any useful experiments, or in fact anything of a similar nature to those articles which have made QST what it is today.

Under the arrangement at present being carried out the Canadian General Manager is to act as editor of the material for this section so that you are hereby requested to send all stories or articles for this section to him. The more he gets, the better our section will be and if it is sufficiently successful, we will in time be able to occupy more space in our magazine.

Canadian Representation at the I.A.R.U. Conference at Paris, Easter, 1925.

Easter of 1925 will mark the time of the first international amateur conference. At this conference we Canadians wish to be represented by one or more men. The great problem of course is one of finance and while we have hopes of obtaining elsewhere than among the membership a certain amount of financial assistance in forwarding our men, the more money we have the more representatives we can send.

The Canadian General Manager therefore hereby appeals to the Canadian members of the League for subscriptions to be sent him by League members to assist in the forwarding of one or more Canadians to Paris for this conference in April. The C. G. M. will act as the trustee of such funds and due credit will be given to every subscriber to this fund.

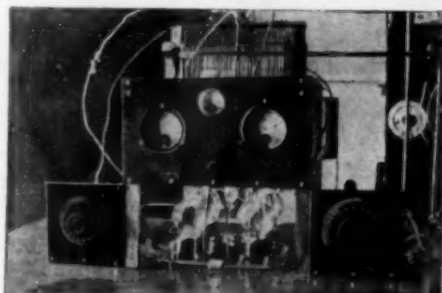
The Canadians will go in company with the United States' representatives and we wish to make the representation from Canada sufficiently strong so that we will form a valuable body at this conference. Come on fellows, kick in!

STATION 1EB, HALIFAX, N. S.

A Well-Known Member of the ROTAB's of the Maritime Division, A.R.R.L.

By Richard Binns, Owner & Operator

While there is nothing unusual in the circuits or operation of c1EB at Halifax, N. S., it may be of interest to some to see a layout which has given excellent satisfaction at this station. The familiar loose-coupled Hartley circuit is used with a tuned plate coil. The antenna coil is composed of one turn wound around the closed-circuit helix and connects directly to a six-wire cage spaced with home-made wooden hexagonal hoops. The antenna is 40 ft. on



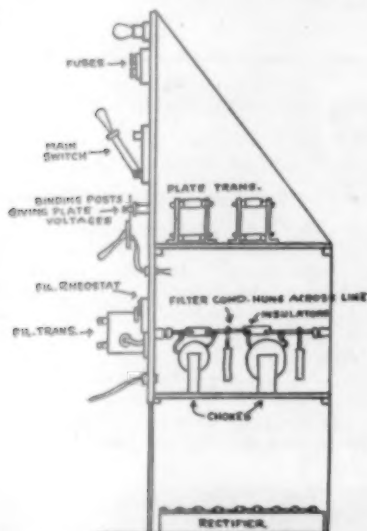
the flat-top with a 20 ft. lead-in. Ordinary glazed porcelain electric light cleats were found to be a good and inexpensive means of breaking up the guy wires which support the 50-ft. wooden mast at the far end of the antenna. These were used in strings of three at every 12 ft. and were found to have sufficient tensile strength, besides affording a break of some 12 in. in the wire. The counterpoise is a six-wire fan.

Four Northern Electric 5-watt tubes are used in the transmitter. These tubes are being operated at 650 volts on the plates and have been found to safely stand 800 as long as the plate current is kept down to about 50 m. a. per tube. They are very economical on filament current, a toy transformer being used to supply current to four tubes. The four sockets are arranged in a square with the grid connections in the center, the grid binding posts being all connected to a point in the center of the square and a lead taken off this point. The

filament leads are two heavy bare copper wires surrounding the squares on three sides and just at the level of the base of the sockets. The wires are $\frac{1}{4}$ in. apart and are bound together with tape in three

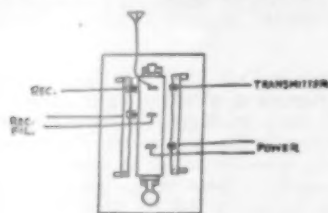
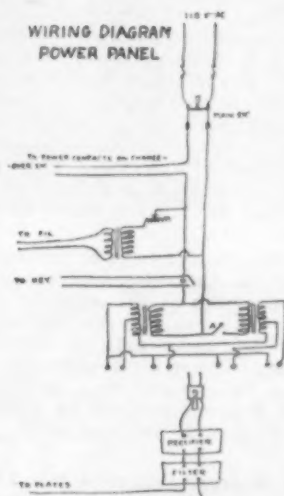
be made with little extra trouble and will greatly simplify the wiring of the completed set and usually make the apparatus more accessible. Sets using a number of tubes in parallel very often have a mass of tangled wires in the vicinity of the sockets for which there is no excuse, as these connections are permanent and never need to be changed.

A very efficient and easily constructed change-over switch of the rotary type is shown in the drawing; which can be made up from junk lying around any amateur station. There are two contacts on each side composed of slot-contacts from old knife switches, and the three blades on the



SIDE VIEW—POWER PANEL

places, around small wooden spacing blocks. The wires are run around the square in opposite directions so that the potential across each filament will be the same. Short taps from the binding-posts on the sockets are soldered to these feeders. The plate connection completely encir-



CHANGE-OVER SWITCH

cles the square at the level of the top of sockets and is supported by the stiff connections coming up from each socket and soldered to the ring. It is well worth your while to wire your tubes in some such arrangement as this, as a very neat job can

rotor are also parts of old knife switches.

All chokes, transformers, rectifiers, etc., are mounted on a separate panel several feet from the transmitter (with the exception of the radio-frequency chokes). The sketch shows the layout at the back of the panel. Flexible leads are taken over from the power panel to the set, for the key, plate supply, filament, and change-over switch. It will be seen from the wiring diagram that as soon as the change-over switch is thrown to the transmitting side, the filaments will light and the key will be ready to close the primaries of the plate transformers. Two small plate transformers are used in series at this station. Every time it is desired to change the voltage, two connections must be changed instead of the customary one tap on a single transformer.

This is conveniently done by bringing out the different leads to sets of two binding posts on the front of the panel. A small handle with two copper prongs, con-

(Concluded on page 59)

Calls Heard



Notice

1. Make the list in numerical order according to districts and arrange each district alphabetically. Exactly as the lists herewith.

2. Use commas between calls and print or type with double spacing—skip a line between lines.

3. The list must be in our hands on the first of the month after month of reception. State period of reception.

4. Leave out all stations worked except the one which represents your best dx worked, and insert it in the proper place with an asterisk on either side; viz, *9PDQ*.

5. Please include your call, name, and complete address, indicating how much of it you desire to be published.

F. White, 2BL,

46 Ellice St., Wellington, N. Z.

low, 1yb, 2rk, 3sf, 4io, 4tj, 5aom, 5zai, 6anp, 6afw, 6age, 6agk, 6aks, 6ame, 6arb, 6awt, 6bep, 6bqb, 6bql, 6lqk, 6ego, 6egw, 6eni, 6cnl, 6cto, 6eb, 6fh, 6gt, 6oi, 6ne, 6pl, 6xi, 7sf, 8abb, 8ij, 8xk, 9bel, 9bm. Canada: 3cp.

R. J. Scott, 68 Fisher St.,

Beckenham, Christchurch, New Zealand.

1pl, 4tj, 5ox, 6aan, 6agk, 6ahp, 6akw, 6ao, 6apw, 6awt, 6bjj, 6bl, 6bpb, 6cjj, 6cjk, 6cgo, 6egw, 6cnl, 6cto, 6gt, 6lj, 6oi, 7afn, 7fa, 9bcj, 9bj.

Ralph Slade, 24AG,

15 Harson Terrace, Dunedin, N. Z.

1awn, 1bk, 1bgq, 1bhm, 1emp, 1gr, 1kc, 1pl, 1xs, 2brb, 2bwj, 2cqs, 2ld, 3bhv, 3btu, 3bwj, 3dms, 3dz, 3im, 4ps, 4ij, 4xe, 5dw, 5cn, 5uk, 5ail, 5mi, 5ox, 5anh, 5ux, 5abd, 5vc, 5bpi, 5bcp, 5bqb, 5bbv, 5cdn, 5cag, 5cix, 5cpl, 5emi, 5cnl, 5cto, 5fh, 5cg, 5lj, 5ti. Eng. *2od*. Mex. bx.

F. N. Leverrier, a2BK, "Lorette",

Wentworth Rd., Vaucluse, Sydney, N.S.W., Australia.

1cmp, 1ke, 1rk, 2brb, 3chg, 4cm, 4io, 4oa, 5mi, 5uk, 5zai, 6ao, 6agk, 6apw, 6arb, 6arp, 6ary, 6awt, 6ego, 6enl, 6cto, 6gt, 6sp, 8pl, 9bcj, 9dqu, Eng. 2od.

Heard by a3BQ.

1all, 1mf, 2ab, 2bgi, 2cu, 2pd, 2mc, 2cbg, 6cqe, 6rv, 6zh, 7qd, 8zg.

C. A. Cullinan, Diggers Rest,

Victoria, Australia.

1cmp, 1ke, 6abp, 6ahp, 6aks, 6awt, 6bpo, 6cgo, 6cjo, 6uc, 6vc, 8zg, 9exy, 9ke.

b-2SP, Rua Frei Caneca No. 22, Sao Paulo, Brazil, South America.

1bk, 1brb, 1li, 1xz, 1yb, 1ow, 1aac, 1ary, 2ch, 2rk, 2xi, 2pl, 4my, 4oa, 4fs, 4tj, 5lu, 5du, 5gy (7), 6rm, 6bq, 6xi, 8gx, 8pl, 8vq, 9bc, 9na. British: 2kf, 2sz, 2nm. French: 8sm.

Major Raven-Hart, c9TC,

Los Andes, Chile.

1gr, 1sf, 4cr, 5agn, 5ail, 5dw, 5hp, 5mi, 5ox, 6abk, 6aks, 6bcp, 6egw, 6xi, 8zg, 9bm, 9eky. N. Z. *2ac*, 4aa, 4ag, 4ak

Belgian 4YZ.

1abf, 1ary, 1btd, 1bie, 1bjo, 1cab, 1chg, 1ck, 1ekj, 1cmp, 1da, 1gs, 1grv, 1li, 1kc, 1py, 1rp, 1sf, 1sw, 1xav, 1xu, 1yb, 2abt, 2ag, 2bgg, 2by, 2byk, 2cbg, 2cc, 2cva, 2cvu, 2dn, 2kx, 2qg, 2rk, 3bg, 3bta, 3che, 3chg, 3hg, 3mf, 3ot, 3sf, 3ud, 3yo, 4da, 4fs, 4gw, 4io, 4jr, 4ku, 5ca, 5lf, 5lm, 6akw, 7ku, 8ago, 8aig, 8aly, 8cko, 8tr, 8uf, 8vq, 9hav. Canadian: 1ar, 1bq, 1dq. South American: 1px, 1pz. New Zealand: 4aa.

Rudolph C. A. Couppez,

23 Rue Elise, X.L., Brussels, Belgium.

1bec, 1bez, 1bgq, 1dl, 1lw, 1sw, 1pp, 2bo, 2btw, 2cb, 2cu, 2xi, 3cgs, 3che, 3hh. Canada: 1ar, 2bn.

Radio P2, Conreue, Villa Marthe,

Watermail, Brussels, Belgium.

1aac, 1aaw, 1abf, 1abu, 1aen, 1agn, 1ajg, 1agv, 1ana, 1anh, 1anr, 1aww, 1bcm, 1bcu, 1bdt, 1bgq, 1bjo, 1bkq, 1bhm, 1bie, 1boa, 1bsd, 1bv, 1cva, 1ck, 1cpk, 1cbf, 1cau, 1ctb, 1cc, 1ckp, 1da, 1dl, 1ef, 1fo, 1gv, 1li, 1ln, 1hn, 1lw, 1ml, 1mo, 1ow, 1on, 1pl, 1py, 1rp, 1sd, 1sf, 1sn, 1sw, 1ub, 1wk, 1xav, 1xm, 1xx, 1xuc, 2adj, 2ana, 2ann, 2arw, 2awf, 2bec, 2bba, 2bco, 2bg, 2bo, 2bqu, 2brb, 2bre, 2by, 2chg, 2ce, 2cg, 2evj, 2eva, 2cvu, 2dd, 2il, 2qh, 2ud, 2wr, 2xq, 3adt, 3afj, 3app, 3ajd, 3auv, 3bec, 3bff, 3bgg, 3bhv, 3bof, 3bpw, 3bsa, 3btp, 3bwj, 3che, 3cja, 3cjp, 3hg, 3hh, 3mf, 3mu, 3nb, 3gc, 3sf, 3tc, 3tf, 4eq, 4fx, 4jr, 4ku, 4my, 4sa, 4sr, 4tj, 4wr, 4xe, 5hl, 5lu, 5gy, 5aly, 5adg, 5amp, 5ayo, 5bau, 5cc, 5cko, 5ca, 5cyl, 5dnv, 5pl, 5xy, 9bcj, 9cpy, 9dqu. Canada: 1ar, 1bq, 1dq, 2be, 2bn, 2do, 2bg, 2bp. N. Z. 4aa, 2ac.

Rene Burdet, f8CS, 4bis Rue Tarbe,

Reims, Marne, France.

1ase, 1aas, 1aaj, 1aay, 1ach, 1af, 1aid, 1aja, 1all, 1amf, 1ana, 1anj, 1atj, 1auc, 1ary, 1aww, 1axx, 1bbe, 1bcl, 1bdt, 1bdx, 1bep, 1ben, 1bgq, 1bhr, 1bie, 1bkr, 1boa, 1bpb, 1bsd, 1bvb, 1bvj, 1bzg, 1ca, 1cab, 1cak, 1ccx, 1cl, 1eme, 1emp, 1eru, 1de, 1gv, 1hn, 1ke, 1lw, 1mk, 1ms, 1on, 1ow, 1pl, 1px, 1py, 1qe, 1qv, 1rd, 1se, 1sf, 1st, 1uw, 1ve, 1vj, 1wy, 1xm, 1xu, 1yb, 2aan, 2acd, 2adm, 2afp, 2ag, 2agb, 2aho, 2aoy, 2apy, 2awf, 2axf, 2ax, 2ber, 2bkr, 2bm, 2bqb, 2br, 2brb, 2bre, 2bac, 2bye, 2byk, 2byw, 2cbg, 2cg, 2cgl, 2cj, 2cix, 2cee, 2cin, 2eqo, 2eqs, 2ety, 2evf, 2evj, 2eva, 2exb, 2cyw, 2dn, 2gh, 2hv, 2kx, 2le, 2mc, 2mu, 2pd, 2ub, 2wr, 3ach, 3adb, 3adp, 3adg, 3aih, 3aja, 3ajd, 3aix, 3apv, 3bay, 3bec, 3bdo, 3bel, 3bhv, 3bip, 3bmn, 3bp, 3bss, 3buy, 3bva, 3bv, 3bwt, 3ca, 3cbl, 3che, 3chg, 3cjin, 3ckj, 3co, 3dk, 3hg, 3hh, 3jo, 3lg, 3mf, 3ot, 3qt, 3sd, 3sf, 3wb, 3wx, 3yo, 4bg, 4do, 4fx, 4fo, 4kd, 4tj, 4tr, 4tw, 5ail, 5ad, 5ti, 5aa, 5abs, 5acy, 5adg, 5afm, 5alf, 5aly, 5atp, 5avd, 5avn, 5ayw, 5haj, 5bbf, 5bbi, 5bcg, 5bcp, 5bbj, 5bjv, 5bnh, 5bpa, 5bpl, 5ebp, 5eci, 5cnw, 5eq, 5eyd, 5dal, 5dgn, 5dnf, 5fm, 5jq, 5kc, 5nb, 5ow, 5pl, 5rg, 5sp, 5tr, 5uf, 5uk, 5yv, 5ach, 5acn, 9bcd, 9bcj, 9bdt, 9bay, 9ba, 9cap, 9cfl, 9cjc, 9ek, 9dhr, 9dmi, 9dqu, 9nd. Canada: 1ar, 1dq, 2be, 2cg, 2gk, 3ad, 3bp. New Zealand: 4aa, 4ag. Australia: 3bq.

Eduard L. Le Blanc, f8DE, 87 Rue Reinard,

Marseille, France.

(December, 1924.) American: 1aay, 1bdx, 1bkq, 1cl, 1ckp, 1dl, 1ms, 1pc, 1py, 1sw, 2adj, 2brb, 2cbg, 2cgl, 2evj, 2rk, 3nb, 3hs, 3ot, 4tj, 5aly. Canadian: 2bg, 2bn. Mexican: 1pl.

PCIL, Leiden, Holland.

1aap, 1aea, 1aig, 1ajx, 1alk, 1atj, 1are, 1ary, 1bec, 1bfc, 1bcl, 1bcu, 1bdx, 1bhm, 1bkr, 1cav, 1cg, 1cl, 1ckp, 1cme, 1cmp, 1cvj, 1da, 1ef, 1er, 1hn, 1lw, 1mc, 1pl, 1sf, 1saw, 1tja, 1xu, 1st, 2ag, 2agw, 2ana, 2axf, 2azy, 2bgr, 2bgu, 2bm, 2bre, 2bce, 2by, 2byn, 2cee, 2cel, 2cix, 2dx, 2fc, 2gk, 2mc, 2xq, 2adg, 2ajd, 2bta, 2buj, 2che, 2chg, 2cjin, 2gv, 2ju, 2mb, 2xc, 2jr, 2wg, 2adg, 2dme, 2xb.

James Steffensen, Ehlersvej 8, Hellerup, Denmark.

1abf, 1aco, 1agh, 1aja, 1ajg, 1alk, 1ans, 1are, 1ary, 1avf, 1awe, 1awg, 1axx, 1bdh, 1bdx, 1bgq, 1bhm, 1bke, 1bkq, 1bsp, 1cbg, 1ckv, 1cme, 1gs, 1gv, 1lw, 1pl, 1py, 1qv, 1yb, 2afp, 2agw, 2ai, 2ana, 2ann, 2bgr, 2bgi, 2bm, 2br, 2by, 2cbg, 2cel, 2cha, 2cty, 2cym, 2em, 2mc, 2rk, 2ud, 2xi, 2ab, 2adb, 2adq, 2aha, 2bay, 2bjp, 2bty, 2chl, 2cc, 2che, 2hg, 2mf, 2sf, 2wb, 2rw, 2bg, 2du, 2fs, 2gc, 2gw, 2jr, 2tj, 2uk, 2wb, 2aly, 2avl, 2sce, 2dal, 2pl, 2sf, 2vg, 2xw, 2nv. All cards QSL'd.

G. Bramslev, Roaravej, Roskilde, Denmark. D-72M.

1anc, 1aar, 1afr, 1aid, 1ajw, 1ajg, 1agf, 1amw, 1anh, 1apk, 1atj, 1ary, 1ayt, 1axx, 1bcc, 1bdt, 1bdx, 1bes, 1bal, 1bq, 1bkr, 1bm, 1blb, 1bon, 1cak, 1cab, 1ckp, 1da, 1ef, 1er, 1fd, 1li, 1ke, 1lw, 1ou, 1se, 1sf, 1sw, 1uf, 1vj, 1xz, 1xak, 1yb, 1ze, 1st, 2aay, 2ag, 2agw, 2ap, 2awu, 2bco, 2bg, 2bgr, 2bgb, 2bm, 2brb, 2bu, 2bqu, 2bum, 2by, 2cee, 2cbg, 2cpk, 2eq, 2mu, 2tp, 2xq, 2abw, 2ajd, 2bdo, 2bg, 2bp, 2cc, 2che, 2chg, 2hh, 2hg, 2jo, 2mb, 2ot, 2io, 2sa, 2tj, 2xe, 2jk, 2vg, 2sce.

Radio IER, Milano, Italy.

1aa, 1aac, 1aar, 1aba, 1abt, 1agh, 1ajg, 1apl, 1arh, 1ary, 1atj, 1ayp, 1axx, 1bdx, 1bdt, 1ber, 1bea, 1bv, 1bvl, 1bu, 1bvb, 1byc, 1bap, 1cbg, 1ckp, 1cpk, 1ere, 1evj, 1da, 1gs, 1gt, 1nerk, 1sw, 1ti, 1udw, 2agw, 2ax, 2az, 2azy, 2bdu, 2bgi, 2bgl, 2bic, 2bn, 2bm, 2br, 2bre, 2byk, 2ce, 2cbr, 2chg, 2cla, 2cee, 2cpg, 2cxw, 2eb, 2ec, 2ud, 2wr, 2ab, 2ade, 2adg, 2adq, 2bjp, 2buv, 2cdg, 2hg, 2hh, 2hs, 2ig, 2mf, 2sf, 2tj, 2bck, 4my, 5ail, 5adg, 5ago, 5avd, 5bau, 5eko, 5doo, 5fm, 5jq, 5tr, 5vg, 5xav, 5xb, 5zw, 5bcj, 5btk, 5cee, 5cus, 5em, 5ep, 5can, 2be, 2bg.

Jenaro Ruiz De Arcaute, EAR3, Tolosa, Spain.

1aac, 1ana, 1aww, 1bal, 1bvl, 1cmp, 2cc, 2cv, 2kx, 2aih, 2ajo, 2cag, 2tj, 2bfe, 2cdg. Canada: 2ej.

J. G. Ritchie, 314 Renfrew St., Glasgow, Scotland.

1aac, 1aar, 1abf, 1aen, 1afa, 1afe, 1ajg, 1amw, 1anh, 1anr, 1apk, 1atj, 1aur, 1bal, 1bcu, 1bdt, 1bgo, 1bjm, 1bvl, 1bx, 1ba, 1cab, 1ckp, 1cme, 1da, 1er, 1fd, 1fo, 1gu, 1hn, 1lw, 1my, 1pl, 1sf, 1aw, 1xm, 1xz, 2aay, 2ad, 2ag, 2anh, 2ann, 2aty, 2auf, 2awf, 2azy, 2bco, 2bgr, 2bqv, 2bwg, 2br, 2chg, 2cco, 2cee, 2cla, 2eq, 2ld, 2mc, 2mu, 2mf, 2pr, 2ud, 2xd, 2xi, 2xq, 2ads, 2ah, 2ajd, 2ap, 2bob, 2bof, 2chg, 2hh, 2jo, 2og, 2ch, 2du, 2eh, 2ke, 2ab, 2xe, 2aly, 2ame, 2bjv, 2dal, 2dea, 2pl, 2xav, 2st.

William G. Rose,

46 Trewince Road, Wimbledon, S.W. 20, England.

1aax, 1aan, 1ar, 1aea, 1anh, 1anr, 1ary, 1avf, 1axx, 1asn, 1axf, 1bal, 1bec, 1bdh, 1bie, 1blb, 1cm, 1ccx, 1cot, 1ere, 1eru, 1da, 1fg, 1hn, 1li, 1mc, 1my, 1ow, 1pl, 1py, 1sw, 1vj, 1xak, 1xam, 1xm, 1xz, 1zad, 1zt, 2aay, 2ad, 2adm, 2ag, 2agd, 2agq, 2agw, 2axf, 2axq, 2azy, 2bgr, 2bgi, 2bm, 2bg, 2bqc, 2bqu, 2bre, 2btl, 2byw, 2cee, 2cel, 2cpk, 2cx, 2dd, 2em, 2mc, 2qb, 2xq, 2abw, 2adb, 2adg, 2adt, 2aih, 2ajd, 2bw, 2cjin, 2hg, 2jw, 2mf, 2og, 2gc, 2tf, 2eh, 2q, 2ha, 2jr, 2kl, 2my, 2oa, 2sa, 2uk, 2acm, 2apr, 2aro, 2sce, 2dal, 2dnf, 2gr, 2jq, 2pl, 2vg, 2vz, 2ejc. Canadians: 1ar, 1dd.

E. J. Martin,

"Wayside", Cobham, Surrey, England.

1abf, 1ae, 1ae, 1aen, 1ajx, 1alk, 1amf, 1ana, 1ao, 1ap, 1are, 1ary, 1aww, 1axx, 1ayp, 1bdx, 1bew, 1bkq, 1bku, 1brk, 1btd, 1bv, 1cab, 1cak, 1cee, 1cl, 1cjc, 1ck, 1ckp, 1cla, 1cme, 1cmp, 1ere, 1eru, 1da, 1ez, 1fd, 1gl, 1gv, 1iw, 1kd, 1kmo, 1mc, 1ow, 1pl, 1py, 1rpa, 1rvu, 1se, 1sf, 1wl, 1xw, 1yb, 1yz, 2abf, 2afp, 2ag, 2ajd, 2ana, 2awf, 2as, 2bbn, 2bdx, 2be, 2bf, 2bgr, 2bn, 2bnc, 2brb, 2bec, 2btl, 2bta, 2buc, 2by, 2byw, 2cag, 2cdg, 2cee, 2cfo, 2cgg, 2cgl, 2chu, 2cpk, 2cpo, 2cpr, 2ca, 2cty, 2cv, 2cu, 2cxw, 2cy, 2dd, 2dm, 2dn, 2dx, 2gk, 2kf, 2kx, 2ky, 2mc, 2mu, 2qh, 2qv, 2rk, 2sf, 2ud, 2wr, 2xm, 2xma, 2xq, 2xqk, 2ade, 2adf, 2adg, 2adv, 2aha, 2aj, 2ajd, 2ama, 2apv, 2ark, 2bco, 2bdo, 2bg, 2bhu, 2bhv, 2bp, 2bq, 2bta, 2buv, 2bva, 2cee, 2che, 2chg, 2cjin, 2gh, 2hs, 2is, 2kf, 2mf, 2ot, 2sf, 2sg, 2te, 2ugr, 2vc, 2wr, 2yo, 2af, 2bg, 2do, 2fs, 2grw, 2io, 2je, 2jr, 2kl, 2ku, 2mb, 2uf, 2sa, 2tj, 2wr, 2hl, 2il, 2lus, 2ue, 2ecb, 2ecg, 2ew, 2ns, 2sbs, 2ada, 2afm, 2akj, 2aly, 2ar, 2arb, 2at, 2awq, 2awx, 2bal, 2bic, 2bn, 2bnd, 2ce, 2ced, 2dal, 2dm, 2doo, 2es, 2gz, 2hm, 2jq, 2kx, 2ky, 2mc, 2nb, 2ry, 2sac, 2tr, 2uf, 2ug, 2vg, 2xav, 2xb, 2xr, 2bcj, 2bht, 2bhy, 2bmx, 2bv, 2ccm, 2cjc, 2dmj, 2dg, 2ebh, 2eky, 2eld, 2ep, 2jc, 2mm, 2tt, 2vz, 2xax. Canadian: 1ae, 1ar, 1ba, 1dq, 2be, 2cg, 2dp. Mexico: 1b. Austria: 2ds, 2bq.

J. Alland Cash, g2GW, "Foxley Mount", Lymn, Cheshire, England.

1aaj, 1abb, 1aen, 1aid, 1aja, 1alk, 1apk, 1anr, 1ary, 1atj, 1bal, 1bec, 1bdt, 1bdx, 1bhm, 1cme, 1crp, 1da, 1ef, 1er, 1je, 1lw, 1ow, 1pl, 1py, 1sf, 1sw, 1ve, 1vc, 1xav, 1xm, 1xam, 1xaz, 1zad, 1zt, 2abd, 2abk, 2afp, 2ag, 2agd, 2agw, 2ax, 2axf, 2bgr, 2bg, 2bgo, 2bm, 2br, 2brb, 2by, 2cel, 2cco, 2cpr, 2evj, 2evo, 2eb, 2eq, 2ku, 2ja, 2ld, 2lw, 2ml, 2mu, 2rk, 2ajk, 2ab, 2adq, 2apv, 2bei, 2bdo, 2bg, 2bjb, 2btu, 2bwt, 2chl, 2chg, 2che, 2civ, 2hg, 2og, 2ot, 2pz, 2rs, 2bg, 2fm, 2ku, 2sa, 2x, 2gl, 2ph, 2add, 2aly, 2avd, 2bjv, 2bmf, 2ch, 2ce, 2cnf, 2gz, 2ke, 2nb, 2st, 2uf, 2vg, 2bcj, 2bw, 2gc, 2dmj, 2dg, 2ebh, 2eky, 2eld, 2ep, 2jc, 2mm, 2tt, 2vz, 2xax. Canadian: 1ar, 2az, 2be, 2cg, 2hv, 2ly.

W. G. Dixon, g5MO (December 1st to 31st),

"Dipwood", Rowlands Gill, Newcastle-on-Tyne, England.

1aac, 1aao, 1aap, 1aba, 1abf, 1aid, 1aj, 1aja, 1ajg, 1alk, 1amr, 1ana, 1apk, 1ary, 1atj, 1atu, 1aww, 1awe, 1aww, 1axx, 1bal, 1ber, 1bdh, 1bdt, 1bdx, 1bep, 1bgi, 1bgq, 1bip, 1bkr, 1bq, 1bv, 1bsp, 1cak, 1cl, 1ckp, 1cme, 1cmp, 1ev, 1da, 1df, 1fr, 1fd, 1fn, 1gl, 1li, 1ke, 1lw, 1my, 1pl, 1py, 1rd, 1rp, 1sf, 1sw, 1ul, 1vy, 1xn, 1xnj, 1xnl, 1xw, 1xz, 1yb, 1za, 1zt, 2ag, 2ana, 2apy, 2bbb, 2bbn, 2bgi, 2bhm, 2bm, 2bn, 2bu, 2br, 2brb, 2bre, 2bum, 2by, 2cco, 2ce, 2cg, 2cix, 2cm, 2cpk, 2cqu, 2cxw, 2cyw, 2dd, 2dx, 2eb, 2em, 2eq, 2fc, 2gk, 2gs, 2ig, 2mc, 2mu, 2rl, 2xq, 2xww, 2zv, 2ab, 2adb, 2adg, 2agt, 2aha, 2aj, 2bco, 2bdo, 2bhv, 2btu, 2bur, 2bw, 2bz, 2cbl, 2cej, 2chg, 2che, 2ckj, 2fs, 2hg, 2hh, 2hg, 2ig, 2mb, 2mf, 2nf, 2og, 2xm, 2ab, 2du, 2eq, 2fx, 2grw, 2it, 2iz, 2je, 2jr, 2my, 2qz, 2sa, 2sx, 2tj, 2xe, 2yz, 2aka, 2agl, 2bch, 2bh, 2lu, 2se, 2uk, 2gsk, 2bjj, 2bq, 2cnl, 2cto, 2ij, 2abm, 2aly, 2amr, 2bbw, 2bhf, 2cel, 2cyl, 2cww, 2dea, 2edf, 2gr, 2ke, 2mc, 2st, 2ud, 2uf, 2atg, 2aw, 2ap, 2bg, 2bhx, 2ccq, 2cen, 2cpj, 2cjc, 2cph, 2ddw, 2dg, 2dlw, 2dtt, 2dur, 2ehm, 2efa, 2eld, 2ell, 2em, 2ey, 2fj, 2ghw, 2of, 2canadian: 1ar, 1dq, 1ef, 1ei, 2be, 2cg, 2fu, 2bw. Mexican: 1b. N. Z. 4aa, 4ag. Australia: 2bq. India: 2bk. Unknown: mz, cs, ch, 1raq, 2gh. All cards qsl-ed. Qrv hr 96m.

Can. 3du, 424 Horton St., London, Ont., Canada.

1aac, 1aap, 1abf, 1aen, 1ahj, 1ajg, 1ajo, 1ajt, 1ajy, 1ald, 1air, 1amm, 1ary, 1awo, 1awq, 1aww, 1axn, 1axx, 1aar, 1bbg, 1bbc, 1ber, 1bdh, 1bep, 1biq, 1bjo, 1bon, 1bub, 1bua, 1buc, 1cax, 1cl, 1cit, 1ckp, 1cme, 1cmp, 1da, 1id, 1il, 1je, 1ke, 1lw, 1mi, 1my, 1nt, 1py, 1sw, 1vj, 2ak, 2xm, 2xm, 2xu,

1xw, 1xx, 2aan, 2adj, 2afo, 2afq, 2ag, 2ahb, 2aja, 2aqb, 2ax, 2axf, 2bbx, 2bgi, 2bjo, 2bqc, 2bqu, 2br, 2buy, 2by, 2cee, 2cef, 2cgl, 2cmx, 2cnm, 2cpa, 2cpk, 2cpo, 2cup, 2ctq, 2evj, 2ewj, 2exh, 2cxr, 2dd, 2em, 2mu, 2qb, 2wr, 2wz, 2xi, 2xu, 2abw, 2ach, 2adh, 2adq, 2aha, 2alx, 2apv, 2auv, 2ava, 2bdo, 2bfu, 2bhv, 2bmn, 2bms, 2bq, 2cbl, 2ccx, 2cdv, 2che, 2ckl, 2bq, 2bw, 2cl, 2db, 2du, 2dv, 2eh, 2eq, 2fa, 2fg, 2ft, 2fx, 2gw, 2io, 2it, 2iz, 2jk, 2jr, 2ke, 2kk, 2ku, 2mb, 2ml, 2my, 2ne, 2nj, 2os, 2qw, 2rm, 2sb, 2sl, 2uk, 2vj, 2xe, 2aad, 2aat, 2abn, 2ac, 2acl, 2acm, 2ads, 2aek, 2acx, 2agj, 2agl, 2ags, 2agv, 2ahj, 2aih, 2ail, 2alu, 2aly, 2ajh, 2ajn, 2ajt, 2akn, 2akp, 2alz, 2am, 2ame, 2aom, 2aot, 2ap, 2api, 2apq, 2aqa, 2ari, 2asg, 2ash, 2atx, 2ca, 2ce, 2cv, 2dm, 2ek, 2ew, 2hl, 2ik, 2jf, 2ka, 2lu, 2ov, 2ph, 2qk, 2qy, 2rh, 2sd, 2se, 2sl, 2uk, 2uk, 2vm, 2xa, 2zal, 2zas, 2agk, 2ajh, 2akw, 2apw, 2arb, 2ats, 2awt, 2bcl, 2bdh, 2bdt, 2bgr, 2bir, 2bjx, 2bka, 2bqa, 2cfs, 2cig, 2cmi, 2cni, 2cns, 2cra, 2csc, 2cto, 2ch, 2fh, 2gt, 2kr, 2kt, 2ma, 2oh, 2oi, 2pl, 2rn, 2ta, 2uw, 2vc, 2xbn, 2xi, 2abb, 2dd, 2ku, 2ls, 2mf, 2nf, 2ver, 2wh, 2wh, 2he, 2's and 9's too numerous. Canadians: 1ae, 1ar, 1dd, 1el, 2as, 2cg, 2fi, 2dm, 2fo, 2aac, 2aeg, 2afp, 2cg, 2gu, 2kq, 2ly, 2qj, 2tf, 2tr, 2er, 2fx, 2go, 2al, 2bc. Bermuda: ber. Cuba: 2cy. Porto Rico: 2aa, 2je. All cards will be answered promptly.

3QW, Pottstown, Penn.

5adw, 5aek, 5aeg, 5afq, 5agn, 5ajp, 5ak, 5apl, 5ar, 5arb, 5ash, 5att, 5ato, 5aw, 5bw, 5bx, 5cu, 5el, 5gq, 5il, 5ke, 5kf, 5qh, 5qk, 5wi, 5xay, 5zao, 5aam, 5ech, 5edg, 5chx, 5enf, 5eny, 5cqe, 5cao, 5cta, 5ctm, 5cve, 5er, 5ql, 5rg, 5uo, 5uv, 5aha, 5ald, 5alk, 5ki, 5kz, 5mb, 5ok, 5ol, 5aaf, 5aal, 5afw, 5agh, 5ahe, 5ajv, 5aku, 5akb, 5ala, 5ali, 5alm, 5amb, 5amu, 5anh, 5aoi, 5aor, 5aot, 5aou, 5apy, 5ask, 5atm, 5ato, 5aqs, 5aau, 5avb, 5ave, 5avj, 5avt, 5avv, 5awu, 5awz, 5axo, 5axh, 5bag, 5bah, 5baz, 5bbj, 5bca, 5bcj, 5bdb, 5be, 5beg, 5bf, 5bbh, 5bic, 5bjh, 5bjk, 5bkj, 5bmc, 5bpm, 5brn, 5brv, 5baf, 5bxi, 5bye, 5cab, 5cap, 5cau, 5chy, 5cco, 5ceb, 5efe, 5efo, 5ekg, 5elc, 5ekm, 5eko, 5eld, 5eyr, 5eyy, 5eze, 5day, 5dbb, 5del, 5deg, 5dge, 5dgl, 5dhl, 5dhu, 5dke, 5dml, 5dmy, 5dmz, 5dnp, 5dpc, 5dww, 5dxg, 5dye, 5ebq, 5edg, 5edh, 5efd, 5egs, 5egt, 5ehq, 5elh, 5ejc, 5eju, 5efj, 5fl, 5fv, 5ge, 5gp, 5hp, 5ix, 5ng, 5pn, 5qd, 5qr, 5tr. Canadian: 1dq, 2dn, 2arh, 2dz, 2jh, 2nj, 2ph, 2wt, 2wv.

V. O. Tresidder, 1634 Arthur Avenue, Chicago, Illinois.

1aac, 1aag, 1aak, 1aao, 1acb, 1acz, 1ad, 1aea, 1ajg, 1ajo, 1ajp, 1ajx, 1aks, 1all, 1amf, 1ana, 1ano, 1ary, 1aur, 1aw, 1aww, 1awy, 1axz, 1ban, 1bbe, 1bbe, 1bel, 1bdx, 1bfb, 1bg, 1bgr, 1bgu, 1bis, 1bjo, 1bjt, 1bkq, 1bac, 1bv, 1bvb, 1bvl, 1bz, 1bxq, 1cab, 1cc, 1ccp, 1ck, 1ckq, 1eme, 1cmp, 1cmx, 1coj, 1eru, 1er, 1es, 1fb, 1fd, 1gs, 1hn, 1ld, 1my, 1ow, 1pl, 1py, 1qm, 1qv, 1rd, 1se, 1ts, 1vf, 1wl, 1wy, 1xj, 1xw, 1xz, 1yb, 1yd, 1ze, 1st, 2aan, 2abt, 2ach, 2adj, 2adm, 2afp, 2agb, 2am, 2ana, 2anm, 2awf, 2axf, 2axy, 2bbn, 2bgr, 2bgi, 2bgo, 2bkr, 2bm, 2box, 2bqb, 2bqc, 2bqu, 2bw, 2brb, 2brc, 2bac, 2bum, 2by, 2byk, 2cbg, 2ccj, 2cee, 2eft, 2egj, 2ej, 2cnk, 2cpo, 2go, 2csl, 2cta, 2cty, 2evj, 2evu, 2cx, 2cxm, 2cyu, 2cyw, 2czb, 2dd, 2dn, 2fg, 2fs, 2gk, 2ha, 2je, 2ke, 2kf, 2ku, 2mc, 2rm, 2wa, 2wb, 2wr, 2xq, 2zb, 2ab, 2adb, 2ade, 2adu, 2adt, 2adw, 2aen, 2alx, 2apu, 2agr, 2as, 2auv, 2aya, 2bdi, 2bdo, 2bei, 2bfq, 2bg, 2bjp, 2bpl, 2bmn, 2bms, 2bng, 2bnu, 2bof, 2ban, 2bua, 2buc, 2buu, 2ch, 2cbl, 2ccx, 2cdg, 2cej, 2cf, 2che, 2chg, 2chh, 2cjp, 2ckp, 2cm, 2gc, 2gk, 2hh, 2hj, 2jw, 2ku, 2lg, 2ll, 2mf, 2qv, 2sf, 2sm, 2te, 2tp, 2uf, 2wn, 2wa, 2xm, 2yo, 2ai, 2al, 2bq, 2do, 2du, 2eq, 2fs, 2fx, 2gw, 2hw, 2io, 2jr, 2ks, 2ke, 2kl, 2ku, 2mb, 2my, 2os, 2pd, 2ai, 2ti, 2tn, 2tw, 2ua, 2uk, 2ano, 2ab, 2afq, 2afh, 2agk, 2aiw, 2aji, 2alw, 2ame, 2apw, 2ase, 2av, 2bas, 2bgr, 2bik, 2bjj, 2bka, 2biw, 2bni, 2bny, 2bpf, 2bra, 2buh, 2bur, 2can, 2cc, 2cfs, 2cgo, 2cjb, 2cmi, 2cni, 2cnn, 2crx, 2car, 2cas, 2cte, 2ctn, 2cvn, 2cwi, 2cxz,

6dn, 6ea, 6ew, 6jl, 6lj, 6of, 6oi, 6pl, 6rn, 6ts, 6vc, 6vd, 6wl, 6wt, 6zh, 7fo, 7cy, 7df, 7dj, 7gb, 7lj, 7ku, 7lg, 7ls, 7mg, 7mp, 7pd, 7ay, 7sq. Canada: 1ar, 2am, 2be, 2hv.

THE CANADIAN SECTION

(Continued from page 56)

nected direct to the rectifier, is used to plug in on any set of binding posts. Switch A is opened when only the first transformer is needed, thus the key only breaks the primary of the first transformer. Referring to the sketch the transformers are on the top shelf behind the panel, the filter on the middle, and the 36-jar rectifier on the bottom. The leads from the rectifier come up at the back to two heavy copper wires stretched from the back of the panel to the wall just above the second shelf. The positive wire is broken in two places by insulators and the chokes are connected to the wire by clips at these places. Each filter condenser is equipped with a wire hook soldered to each lug, by means of which they may be hung across the line at any place on either side of each choke coil. Thus any arrangement of the chokes and condensers may be obtained without tearing out connections, and it may be seen at a glance just what the filter system is.

The switch B short-circuits the leads to the key, when the key is taken out and used in some other part of the circuit.

It seems to the writer that the scheme of keeping all this apparatus separate, greatly simplifies the adjustment and operation of the transmitter itself, and affords a better chance for experimenting with the set, besides making a neat and attractive station.

NOTICE

In reference to the offer on page 100 of February QST, in which we offered a copy of Ballantine's "Radio Telephony for Amateurs" to each man sending in six subscriptions to QST, the publishers have just written us that the present edition is exhausted, and that a revision will be made before another printing. We cannot, therefore, guarantee immediate delivery on Ballantine. If you are willing to wait for your copy, all right; just so note in your letter. For those wishing prompt recompense for their work we have made arrangements to give Prof. Ramsay's "Experimental Radio" as a substitute. This work is favorably known among amateurs; it is an invaluable guide for the man who likes to experiment with radio. It lists for \$2.00, the same price as Ballantine. Be sure and say whether you wish Ramsay's book at once, or are willing to wait for Ballantine, revised edition, to be sent later.

Communications

The Publishers of QST assume no responsibility for statements made herein by correspondents



Let's Continue To Deserve This

149 Lowther Parade,
Barnes, London, S. W. B., Eng.

Editor, QST:

Having worked transatlantic about 50 times and connected with 40 of your men so far this winter, I feel that I have gained sufficient experience to pass on my views to you thereon.

Firstly with regard to bum fists, bug keys and CQing! I have not the slightest doubt in saying that the improvement is tremendous. You men are now sending beautifully. Whether it has to do with your repeated "jabs" in QST or whether it has been found to answer best to send better, I do not know; but the fact remains there has been an immediate response to our prayer for better sending and the removal of "bugs."

With regard to CQing: this still exists with certain stations and no doubt their DX lists suffer sufficiently for their folly.

There is another type of station which CQ's and calls Europe continually all night and every night, but does not appear to listen. I have little doubt that you know pretty well which stations are the offenders in this class. It may be that they are troubled with rotten receiving conditions due to QRM of various natures, but we notice that in each case their transmitters are among the highest powered and their signals romp in here with an earsplitting crack.

A wonderful change is noticed in the quality of note transmitted from your side. It was very seldom indeed last year that one listened to a pure D.C. or well rectified note from your men; but now the notes are all beautifully rectified and a huge number are pure D.C. This is particularly interesting in view of the writings we have had in QST and elsewhere regarding D.C. notes and the very low waves. I wonder if your men have observed a similar improvement at our end? Nearly all of our men are using A.C. with the exception of 2KF and myself who use D.C. generators.

—Kenyon Secretan.

The Ham in a New Role

Merrick,
Nassau County, N. Y.

Editor, QST:

Something occurred the other nite that I thot was rather amusing. It is this:

My fone has a reputation around town that can be called good or bad. Anyway it comes in all over the dial of receiving sets that are not very selective.

Now, as it happened, one evening about 7:30 P. M. I was calling CQ on the fone, when a BCL called up and said: "My kids are listening to the bedtime stories." I said "All right, old man, I'll quit." But he said, "No. I don't want you to quit, I want you to tell my kids, (he gave me their names) that you are Santa Claus and that if they are good that you will stop at their house and leave them something very nice."

This I did, very much to his satisfaction. Rather odd part for an amateur "program Buster" to take. Is it not?

—N. D. Chasnoff, 9BVK.

Thanks, OM

Shag Valley Station
Waihemu, Palmerston South
Otago, N. Z.

Editor, QST:

I had hardly parted with my last letter which was grumbling at the QSB of most of the Yanks on 80 meters, when there seemed to be a marked improvement. Consequently I have been very much more successful in working them and have worked over two dozen yanks since my last letter. Yanks from every district save the seventh and fourth.

Another thing—we out here want to take off our hats to you fellows as regards reception. Whatever we may have said or thought about your abilities in this line in the past is rubbed out now. The usual amateur over here has a single 203—nuf sed.

—F. D. Bell, 24AA.

Welcome, Brother!

Mr. Hiram Percy Maxim:

I should be proud to wear the golden earmuffs of the A.R.R.L., if I am found worthy. My qualifications are as follows:

1. My brother-in-law lives in Hartford. He threatens to introduce me the next time I go there.

2. Although I have no sending outfit, my receiver is a wonder. It took the Grand Prix at the Exposition de Junk in 1901. The geographical co-ordinates of its centre of oscillation are Lat. 40° 40' 40" N., Long.

73° 33' 00" W., although its divers parts are scattered over the whole table.

3. I derive much comfort from the communications from NAA, 1AW and other stations of that class. I am an applicant for the rating of Eavesdropper, 1st Class, as my station log shows that I can get GE OM FB QRK? from four stations simultaneously with one ear tied behind my back.

4. Perhaps my most impressive qualification is that I have two dollars. I am parting with it affectionately, and enclosing it in a check.

—Harold Bunker.

To Get a Good Note With Self-Rectification

El Dorado, Kansas.

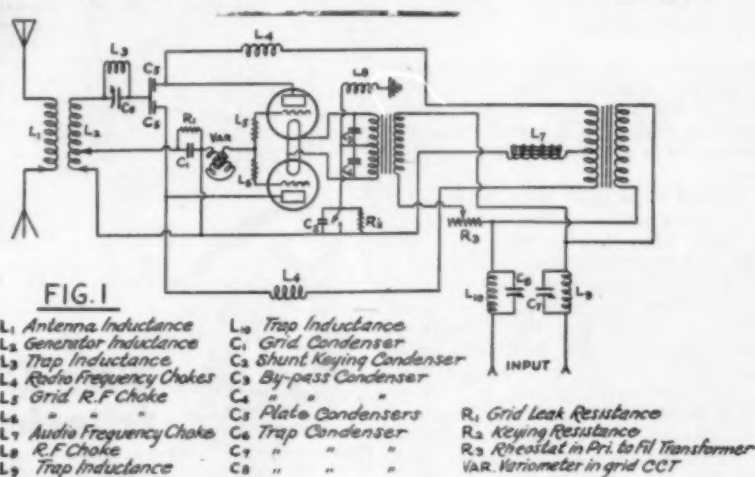
Editor, QST:

Some few months ago I wrote you a letter with regard to the use of kenotron tubes for use in amateur radio telegraphy. Several letters have come to my attention since that time complaining that there are quite a few amateurs who are not able to afford the installation of kenotron tube rectification. I am inclosing a circuit which will, when used with the self rectifying system, enable the station owners to secure nearly pure DC without the additional expense of

I feel sure that the diagram which is attached will fully explain to those who wish to try this circuit everything that is absolutely necessary for the proper operation of a set utilizing AC. The audio-frequency choke which was employed during the experiment was of a rather unusual type of construction. The inductance of the coil measured 50 henrys. The core was composed of silicon steel and was in the form of the well known figure eight style. Diagram No. 2 shows exactly the assembly of this audio frequency choke.

A word might be said here with regard to the tuning of this set. Referring to Figure 2 on page 53 of the January issue of QST, you will note the use of the trap circuit for harmonics in the plate side of an oscillating circuit used in conjunction with the tuned radio frequency choke in the power leads. These two trap circuits are really necessary for the proper operation of the circuit which I have given in Figure 1. It was found that when the large audio frequency choke was inserted in the negative lead of the plate supply and the variometer employed in the grid circuit of the set was tuned, that the note could be changed to one nearly approaching pure DC.

It will be noted that there are no filter condensers used in the circuit. The set should be inductively coupled to the antenna



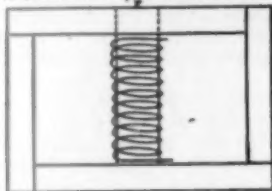
installing kenotron tubes and further circuits.

Experiments over the past five months have developed some rather surprising results. In addition to the regular grid choke coils, a small variometer of standard make was connected in series between the grid condenser and the grid choke, and a large audio-frequency choke was introduced into the negative lead of the plate transformer.

to avoid disturbing those in the near vicinity. While the signals emitted from a set of this character do not sound as though they were D.C. to one close to the transmitter; I am sure that those who are located near those who try this will find that fully 50% or 60% of their trouble from the 60-cycle growl will have been eliminated. One should not expect reports of your note being absolutely pure D.C. from those who

are located too close. Relying upon some well-known amateur who is located some distance, say 50 or more miles away, for a report; have him assist you in the tuning of the grid variometer by reports, until the note approaches its best point. This adjustment is very critical and it will be necessary that close co-operation from some other amateur located some distance away be obtained. Preferably 100 or so miles away,

Can use "wedge" to vary but not found desirable in experimental set



No air gap is indicated, but may be employed if desired. No further improvement was noted with air gap during experiments and only constitutes additional adjustments

FIG. 2

in order to get an accurate adjustment which will permit ready keying; and the note which is so much desired by those who cannot afford the cost of the installation of kenotron tubes for a direct current supply to their set.

It is my sincere hope that those who cannot afford the installation of kenotron tubes will divert their attention to this type of circuit; thus eliminating the messy chemical rectifier and still securing the same degree of satisfaction in being able to get through without disturbing those located close to them. So, boys, hop to it, and let's see just how much can be developed along this line. There is nothing that will ever compare with pure D.C. as far as getting through consistently is concerned. However, in view of the fact that some of our most prominent amateur and commercial men do not favor pure D.C. due to the fact that it is so wearisome to copy, I am sure that they will welcome this solution of the problem with open arms. This circuit really works. If you don't believe it, all I ask is that you give it a fair trial. Address any communications regarding this circuit to QST who will forward same to me, and I will endeavor to help all that I possibly can to clear up any points which are not absolutely clear.

—M. B. Lowe.

A Chance, Chicago

2638 Mulligan Ave.
Chicago, Ill.

Editor, QST:

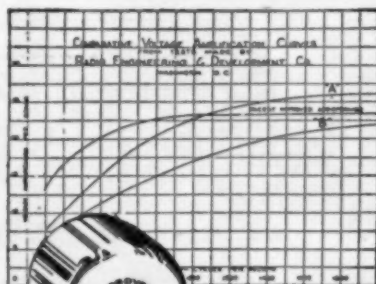
Please slip this request in your top-hole magazine, any corner will do. I am only a B.C.L. but I hope you will take pity on me.

I have a detector and two-stage amplifier which tunes 'way down as well as on regular B.C. wavelengths, and your gang are so friendly that I want to get in the swim, so to speak.

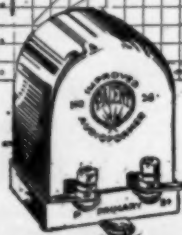
What I want is to have some amateur, who lives, and does his stuff in Chicago, take me under his wing, let me paw over his junk and give me what tips he can. I can handle as many answers as I get, I am sure. I want to get a start at the game and this is the best way I can think of. Your boys are so friendly to listen to, that I am sure someone will Q.S.L. my S.O.S. So, "come in," Chicago. I will pay it back to someone else when I can do my stuff.

Thank you, Mr. Editor, your magazine and whoever answers my call. I remain, but not for long, I hope, a B.C.L.

L. C. Whitaker, Jr.
Phone Columbus 9737.



Comparative voltage amplification curves from tests made by the Radio Engineering and Development Company of Washington, D. C.



The Chart tells the story

High amplification over entire band of sound frequencies. Undistorted reproduction at all frequencies, with no one high peak of amplification at any point of the band. Brass grounded case, with satin nickel finish. Ratio 3 1/2 to 1. Location of binding posts permit short leads. The better class dealers carry Pacent Radio Essentials. Send for complete catalog.

PACENT ELECTRIC COMPANY, Inc.

91 Seventh Avenue, New York City

Washington Minneapolis Boston San Francisco
Chicago Birmingham Philadelphia St. Louis
Buffalo Jacksonville Detroit

Pacent
RADIO ESSENTIALS

DON'T IMPROVISE - PACENTIZE

BURGESS BATTERIES

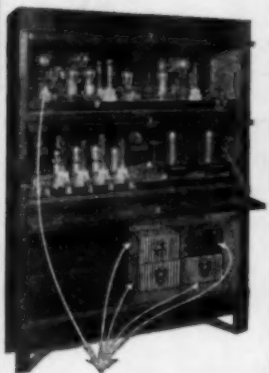
Contribute to a Radio Miracle



President Coolidge



H.R.H. The Prince of Wales



The transmitter that sent photos by radio from London to New York. Batteries for energizing the tubes are shown in the lower shelves of the cabinet.



General view obtained through courtesy of the Radio Corporation of America. Captain Richard Ranger of the R. C. A., inventor of the apparatus, is seen placing film upon drum of transmitter.

A. & U. Photos

THAT Burgess Radio Batteries were chosen for this inspiring achievement is a pleasing indication of the confidence placed in them by experienced radio engineers.

Ask Any Radio Engineer

BURGESS BATTERY COMPANY

Engineers DRY BATTERIES Manufacturers
Flashlight - Radio - Ignition - Telephone
General Sales Office: Harris Trust Bldg., Chicago
Laboratories and Works: Madison, Wisc.

In Canada: Niagara Falls and Winnipeg



To Our Readers Who Are Not A. R. R. L. Members

Wouldn't you like to become a member of the American Radio Relay League? We need you in this big organization of radio amateurs, the only amateur association that does things. From your reading of *QST* you have gained a knowledge of the nature of the League and what it does, and you have read its purposes as set forth on page 6 of every issue. We would like to have you become a full-fledged member and add your strength to ours in the things we are undertaking for Amateur Radio, and incidentally you will have the membership edition of *QST* delivered at your door each month. A convenient application form is printed below—clip it out and mail it today.

.....1925

American Radio Relay League,
Hartford, Conn.

Being genuinely interested in Amateur Radio, I hereby apply for membership in the American Radio Relay League, and enclose \$2 (\$2.50 in foreign countries) in payment of one year's dues. This entitles me to receive *QST* for the same period. Please begin my subscription with theissue. Mail my Certificate of Membership and send *QST* to the following name and address.

.....
.....
.....

Station call, if any

Grade Operator's license, if any

Radio Clubs of which a member

Do you know a friend who is also interested in Amateur Radio, whose name you might give us so we may write him about the League?

..... Thanks?



Morse Handy Radio Set No. 3

MACHINE SCREW TAPS: 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100

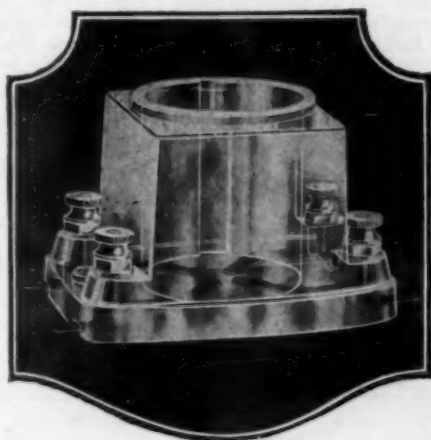
STRAIGHT SHANK DRILLS: 1/16, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1 1/8, 1 1/4, 1 1/2, 1 3/4, 1 7/8, 2, 2 1/8, 2 1/4, 2 1/2, 2 3/4, 2 7/8, 3, 3 1/8, 3 1/4, 3 1/2, 3 3/4, 3 7/8, 4, 4 1/8, 4 1/4, 4 1/2, 4 3/4, 4 7/8, 5, 5 1/8, 5 1/4, 5 1/2, 5 3/4, 5 7/8, 6, 6 1/8, 6 1/4, 6 1/2, 6 3/4, 6 7/8, 7, 7 1/8, 7 1/4, 7 1/2, 7 3/4, 7 7/8, 8, 8 1/8, 8 1/4, 8 1/2, 8 3/4, 8 7/8, 9, 9 1/8, 9 1/4, 9 1/2, 9 3/4, 9 7/8, 10, 10 1/8, 10 1/4, 10 1/2, 10 3/4, 10 7/8, 11, 11 1/8, 11 1/4, 11 1/2, 11 3/4, 11 7/8, 12, 12 1/8, 12 1/4, 12 1/2, 12 3/4, 12 7/8, 13, 13 1/8, 13 1/4, 13 1/2, 13 3/4, 13 7/8, 14, 14 1/8, 14 1/4, 14 1/2, 14 3/4, 14 7/8, 15, 15 1/8, 15 1/4, 15 1/2, 15 3/4, 15 7/8, 16, 16 1/8, 16 1/4, 16 1/2, 16 3/4, 16 7/8, 17, 17 1/8, 17 1/4, 17 1/2, 17 3/4, 17 7/8, 18, 18 1/8, 18 1/4, 18 1/2, 18 3/4, 18 7/8, 19, 19 1/8, 19 1/4, 19 1/2, 19 3/4, 19 7/8, 20, 20 1/8, 20 1/4, 20 1/2, 20 3/4, 20 7/8, 21, 21 1/8, 21 1/4, 21 1/2, 21 3/4, 21 7/8, 22, 22 1/8, 22 1/4, 22 1/2, 22 3/4, 22 7/8, 23, 23 1/8, 23 1/4, 23 1/2, 23 3/4, 23 7/8, 24, 24 1/8, 24 1/4, 24 1/2, 24 3/4, 24 7/8, 25, 25 1/8, 25 1/4, 25 1/2, 25 3/4, 25 7/8, 26, 26 1/8, 26 1/4, 26 1/2, 26 3/4, 26 7/8, 27, 27 1/8, 27 1/4, 27 1/2, 27 3/4, 27 7/8, 28, 28 1/8, 28 1/4, 28 1/2, 28 3/4, 28 7/8, 29, 29 1/8, 29 1/4, 29 1/2, 29 3/4, 29 7/8, 30, 30 1/8, 30 1/4, 30 1/2, 30 3/4, 30 7/8, 31, 31 1/8, 31 1/4, 31 1/2, 31 3/4, 31 7/8, 32, 32 1/8, 32 1/4, 32 1/2, 32 3/4, 32 7/8, 33, 33 1/8, 33 1/4, 33 1/2, 33 3/4, 33 7/8, 34, 34 1/8, 34 1/4, 34 1/2, 34 3/4, 34 7/8, 35, 35 1/8, 35 1/4, 35 1/2, 35 3/4, 35 7/8, 36, 36 1/8, 36 1/4, 36 1/2, 36 3/4, 36 7/8, 37, 37 1/8, 37 1/4, 37 1/2, 37 3/4, 37 7/8, 38, 38 1/8, 38 1/4, 38 1/2, 38 3/4, 38 7/8, 39, 39 1/8, 39 1/4, 39 1/2, 39 3/4, 39 7/8, 40, 40 1/8, 40 1/4, 40 1/2, 40 3/4, 40 7/8, 41, 41 1/8, 41 1/4, 41 1/2, 41 3/4, 41 7/8, 42, 42 1/8, 42 1/4, 42 1/2, 42 3/4, 42 7/8, 43, 43 1/8, 43 1/4, 43 1/2, 43 3/4, 43 7/8, 44, 44 1/8, 44 1/4, 44 1/2, 44 3/4, 44 7/8, 45, 45 1/8, 45 1/4, 45 1/2, 45 3/4, 45 7/8, 46, 46 1/8, 46 1/4, 46 1/2, 46 3/4, 46 7/8, 47, 47 1/8, 47 1/4, 47 1/2, 47 3/4, 47 7/8, 48, 48 1/8, 48 1/4, 48 1/2, 48 3/4, 48 7/8, 49, 49 1/8, 49 1/4, 49 1/2, 49 3/4, 49 7/8, 50, 50 1/8, 50 1/4, 50 1/2, 50 3/4, 50 7/8, 51, 51 1/8, 51 1/4, 51 1/2, 51 3/4, 51 7/8, 52, 52 1/8, 52 1/4, 52 1/2, 52 3/4, 52 7/8, 53, 53 1/8, 53 1/4, 53 1/2, 53 3/4, 53 7/8, 54, 54 1/8, 54 1/4, 54 1/2, 54 3/4, 54 7/8, 55, 55 1/8, 55 1/4, 55 1/2, 55 3/4, 55 7/8, 56, 56 1/8, 56 1/4, 56 1/2, 56 3/4, 56 7/8, 57, 57 1/8, 57 1/4, 57 1/2, 57 3/4, 57 7/8, 58, 58 1/8, 58 1/4, 58 1/2, 58 3/4, 58 7/8, 59, 59 1/8, 59 1/4, 59 1/2, 59 3/4, 59 7/8, 60, 60 1/8, 60 1/4, 60 1/2, 60 3/4, 60 7/8, 61, 61 1/8, 61 1/4, 61 1/2, 61 3/4, 61 7/8, 62, 62 1/8, 62 1/4, 62 1/2, 62 3/4, 62 7/8, 63, 63 1/8, 63 1/4, 63 1/2, 63 3/4, 63 7/8, 64, 64 1/8, 64 1/4, 64 1/2, 64 3/4, 64 7/8, 65, 65 1/8, 65 1/4, 65 1/2, 65 3/4, 65 7/8, 66, 66 1/8, 66 1/4, 66 1/2, 66 3/4, 66 7/8, 67, 67 1/8, 67 1/4, 67 1/2, 67 3/4, 67 7/8, 68, 68 1/8, 68 1/4, 68 1/2, 68 3/4, 68 7/8, 69, 69 1/8, 69 1/4, 69 1/2, 69 3/4, 69 7/8, 70, 70 1/8, 70 1/4, 70 1/2, 70 3/4, 70 7/8, 71, 71 1/8, 71 1/4, 71 1/2, 71 3/4, 71 7/8, 72, 72 1/8, 72 1/4, 72 1/2, 72 3/4, 72 7/8, 73, 73 1/8, 73 1/4, 73 1/2, 73 3/4, 73 7/8, 74, 74 1/8, 74 1/4, 74 1/2, 74 3/4, 74 7/8, 75, 75 1/8, 75 1/4, 75 1/2, 75 3/4, 75 7/8, 76, 76 1/8, 76 1/4, 76 1/2, 76 3/4, 76 7/8, 77, 77 1/8, 77 1/4, 77 1/2, 77 3/4, 77 7/8, 78, 78 1/8, 78 1/4, 78 1/2, 78 3/4, 78 7/8, 79, 79 1/8, 79 1/4, 79 1/2, 79 3/4, 79 7/8, 80, 80 1/8, 80 1/4, 80 1/2, 80 3/4, 80 7/8, 81, 81 1/8, 81 1/4, 81 1/2, 81 3/4, 81 7/8, 82, 82 1/8, 82 1/4, 82 1/2, 82 3/4, 82 7/8, 83, 83 1/8, 83 1/4, 83 1/2, 83 3/4, 83 7/8, 84, 84 1/8, 84 1/4, 84 1/2, 84 3/4, 84 7/8, 85, 85 1/8, 85 1/4, 85 1/2, 85 3/4, 85 7/8, 86, 86 1/8, 86 1/4, 86 1/2, 86 3/4, 86 7/8, 87, 87 1/8, 87 1/4, 87 1/2, 87 3/4, 87 7/8, 88, 88 1/8, 88 1/4, 88 1/2, 88 3/4, 88 7/8, 89, 89 1/8, 89 1/4, 89 1/2, 89 3/4, 89 7/8, 90, 90 1/8, 90 1/4, 90 1/2, 90 3/4, 90 7/8, 91, 91 1/8, 91 1/4, 91 1/2, 91 3/4, 91 7/8, 92, 92 1/8, 92 1/4, 92 1/2, 92 3/4, 92 7/8, 93, 93 1/8, 93 1/4, 93 1/2, 93 3/4, 93 7/8, 94, 94 1/8, 94 1/4, 94 1/2, 94 3/4, 94 7/8, 95, 95 1/8, 95 1/4, 95 1/2, 95 3/4, 95 7/8, 96, 96 1/8, 96 1/4, 96 1/2, 96 3/4, 96 7/8, 97, 97 1/8, 97 1/4, 97 1/2, 97 3/4, 97 7/8, 98, 98 1/8, 98 1/4, 98 1/2, 98 3/4, 98 7/8, 99, 99 1/8, 99 1/4, 99 1/2, 99 3/4, 99 7/8, 100, 100 1/8, 100 1/4, 100 1/2, 100 3/4, 100 7/8, 101, 101 1/8, 101 1/4, 101 1/2, 101 3/4, 101 7/8, 102, 102 1/8, 102 1/4, 102 1/2, 102 3/4, 102 7/8, 103, 103 1/8, 103 1/4, 103 1/2, 103 3/4, 103 7/8, 104, 104 1/8, 104 1/4, 104 1/2, 104 3/4, 104 7/8, 105, 105 1/8, 105 1/4, 105 1/2, 105 3/4, 105 7/8, 106, 106 1/8, 106 1/4, 106 1/2, 106 3/4, 106 7/8, 107, 107 1/8, 107 1/4, 107 1/2, 107 3/4, 107 7/8, 108, 108 1/8, 108 1/4, 108 1/2, 108 3/4, 108 7/8, 109, 109 1/8, 109 1/4, 109 1/2, 109 3/4, 109 7/8, 110, 110 1/8, 110 1/4, 110 1/2, 110 3/4, 110 7/8, 111, 111 1/8, 111 1/4, 111 1/2, 111 3/4, 111 7/8, 112, 112 1/8, 112 1/4, 112 1/2, 112 3/4, 112 7/8, 113, 113 1/8, 113 1/4, 113 1/2, 113 3/4, 113 7/8, 114, 114 1/8, 114 1/4, 114 1/2, 114 3/4, 114 7/8, 115, 115 1/8, 115 1/4, 115 1/2, 115 3/4, 115 7/8, 116, 116 1/8, 116 1/4, 116 1/2, 116 3/4, 116 7/8, 117, 117 1/8, 117 1/4, 117 1/2, 117 3/4, 117 7/8, 118, 118 1/8, 118 1/4, 118 1/2, 118 3/4, 118 7/8, 119, 119 1/8, 119 1/4, 119 1/2, 119 3/4, 119 7/8, 120, 120 1/8, 120 1/4, 120 1/2, 120 3/4, 120 7/8, 121, 121 1/8, 121 1/4, 121 1/2, 121 3/4, 121 7/8, 122, 122 1/8, 122 1/4, 122 1/2, 122 3/4, 122 7/8, 123, 123 1/8, 123 1/4, 123 1/2, 123 3/4, 123 7/8, 124, 124 1/8, 124 1/4, 124 1/2, 124 3/4, 124 7/8, 125, 125 1/8, 125 1/4, 125 1/2, 125 3/4, 125 7/8, 126, 126 1/8, 126 1/4, 126 1/2, 126 3/4, 126 7/8, 127, 127 1/8, 127 1/4, 127 1/2, 127 3/4, 127 7/8, 128, 128 1/8, 128 1/4, 128 1/2, 128 3/4, 128 7/8, 129, 129 1/8, 129 1/4, 129 1/2, 129 3/4, 129 7/8, 130, 130 1/8, 130 1/4, 130 1/2, 130 3/4, 130 7/8, 131, 131 1/8, 131 1/4, 131 1/2, 131 3/4, 131 7/8, 132, 132 1/8, 132 1/4, 132 1/2, 132 3/4, 132 7/8, 133, 133 1/8, 133 1/4, 133 1/2, 133 3/4, 133 7/8, 134, 134 1/8, 134 1/4, 134 1/2, 134 3/4, 134 7/8, 135, 135 1/8, 135 1/4, 135 1/2, 135 3/4, 135 7/8, 136, 136 1/8, 136 1/4, 136 1/2, 136 3/4, 136 7/8, 137, 137 1/8, 137 1/4, 137 1/2, 137 3/4, 137 7/8, 138, 138 1/8, 138 1/4, 138 1/2, 138 3/4, 138 7/8, 139, 139 1/8, 139 1/4, 139 1/2, 139 3/4, 139 7/8, 140, 140 1/8, 140 1/4, 140 1/2, 140 3/4, 140 7/8, 141, 141 1/8, 141 1/4, 141 1/2, 141 3/4, 141 7/8, 142, 142 1/8, 142 1/4, 142 1/2, 142 3/4, 142 7/8, 143, 143 1/8, 143 1/4, 143 1/2, 143 3/4, 143 7/8, 144, 144 1/8, 144 1/4, 144 1/2, 144 3/4, 144 7/8, 145, 145 1/8, 145 1/4, 145 1/2, 145 3/4, 145 7/8, 146, 146 1/8, 146 1/4, 146 1/2, 146 3/4, 146 7/8, 147, 147 1/8, 147 1/4, 147 1/2, 147 3/4, 147 7/8, 148, 148 1/8, 148 1/4, 148 1/2, 148 3/4, 148 7/8, 149, 149 1/8, 149 1/4, 149 1/2, 149 3/4, 149 7/8, 150, 150 1/8, 150 1/4, 150 1/2, 150 3/4, 150 7/8, 151, 151 1/8, 151 1/4, 151 1/2, 151 3/4, 151 7/8, 152, 152 1/8, 152 1/4, 152 1/2, 152 3/4, 152 7/8, 153, 153 1/8, 153 1/4, 153 1/2, 153 3/4, 153 7/8, 154, 154 1/8, 154 1/4, 154 1/2, 154 3/4, 154 7/8, 155, 155 1/8, 155 1/4, 155 1/2, 155 3/4, 155 7/8, 156, 156 1/8, 156 1/4, 156 1/2, 156 3/4, 156 7/8, 157, 157 1/8, 157 1/4, 157 1/2, 157 3/4, 157 7/8, 158, 158 1/8, 158 1/4, 158 1/2, 158 3/4, 158 7/8, 159, 159 1/8, 159 1/4, 159 1/2, 159 3/4, 159 7/8, 160, 160 1/8, 160 1/4, 160 1/2, 160 3/4, 160 7/8, 161, 161 1/8, 161 1/4, 161 1/2, 161 3/4, 161 7/8, 162, 162 1/8, 162 1/4, 162 1/2, 162 3/4, 162 7/8, 163, 163 1/8, 163 1/4, 163 1/2, 163 3/4, 163 7/8, 164, 164 1/8, 164 1/4, 164 1/2, 164 3/4, 164 7/8, 165, 165 1/8, 165 1/4, 165 1/2, 165 3/4, 165 7/8, 166, 166 1/8, 166 1/4, 166 1/2, 166 3/4, 166 7/8, 167, 167 1/8, 167 1/4, 167 1/2, 167 3/4, 167 7/8, 168, 168 1/8, 168 1/4, 168 1/2, 168 3/4, 168 7/8, 169, 169 1/8, 169 1/4, 169 1/2, 169 3/4, 169 7/8, 170, 170 1/8, 170 1/4, 170 1/2, 170 3/4, 170 7/8, 171, 171 1/8, 171 1/4, 171 1/2, 171 3/4, 171 7/8, 172, 172 1/8, 172 1/4, 172 1/2, 172 3/4, 172 7/8, 173, 173 1/8, 173 1/4, 173 1/2, 173 3/4, 173 7/8, 174, 174 1/8, 174 1/4, 174 1/2, 174 3/4, 174 7/8, 175, 175 1/8, 175 1/4, 175 1/2, 175 3/4, 175 7/8, 176, 176 1/8, 176 1/4, 176 1/2, 176 3/4, 176 7/8, 177, 177 1/8, 177 1/4, 177 1/2, 177 3/4, 177 7/8, 178, 178 1/8, 178 1/4, 178 1/2, 178 3/4, 178 7/8, 179, 179 1/8, 179 1/4, 179 1/2, 179 3/4, 179 7/8, 180, 180 1/8, 180 1/4, 180 1/2, 180 3/4, 180 7/8, 181, 181 1/8, 181 1/4, 181 1/2, 181 3/4, 181 7/8, 182, 182 1/8, 182 1/4, 182 1/2, 182 3/4, 182 7/8, 183, 183 1/8, 183 1/4, 183 1/2, 183 3/4, 183 7/8, 184, 184 1/8, 184 1/4, 184 1/2, 184 3/4, 184 7/8, 185, 185 1/8, 185 1/4, 185 1/2, 185 3/4, 185 7/8, 186, 186 1/8, 186 1/4, 186 1/2, 186 3/4, 186 7/8, 187, 187 1/8, 187 1/4, 187 1/2, 187 3/4, 187 7/8, 188, 188 1/8, 188 1/4, 188 1/2, 188 3/4, 188 7/8, 189, 189 1/8, 189 1/4, 189 1/2, 189 3/4, 189 7/8, 190, 190 1/8, 190 1/4, 190 1/2, 190 3/4, 190 7/8, 191, 191 1/8, 191 1/4, 191 1/2, 191 3/4, 191 7/8, 192, 192 1/8, 192 1/4, 192 1/2, 192 3/4, 192 7/8, 193, 193 1/8, 193 1/4, 193 1/2, 193 3/4, 193 7/8, 194, 194 1/8, 194 1/4, 194 1/2, 194 3/4, 194 7/8, 195, 195 1/8, 195 1/4, 195 1/2, 195 3/4, 195 7/8, 196, 196 1/8, 196 1/4, 196 1/2, 196 3/4, 196 7/8, 197, 197 1/8, 197 1/4, 197 1/2, 197 3/4, 197 7/8, 198, 198 1/8, 198 1/4, 198 1/2, 198 3/4, 198 7/8, 199, 199 1/8, 199 1/4, 199 1/2, 199 3/4, 199 7/8, 200, 200 1/8, 200 1/4, 200 1/2, 200 3/4, 200 7/8, 201, 201 1/8, 201 1/4, 201 1/2, 201 3/4, 201 7/8, 202, 202 1/8, 202 1/4, 202 1/2, 202 3/4, 202 7/8, 203, 203 1/8, 203 1/4, 203 1/2, 203 3/4, 203 7/8, 204, 204 1/8, 204 1/4, 204 1/2, 204 3/4, 204 7/8, 205, 205 1/8, 205 1/4, 205 1/2, 205 3/4, 205 7/8, 206, 206 1/8, 206 1/4, 206 1/2, 206 3/4, 206 7/8, 207, 207 1/8, 207 1/4, 207 1/2, 207 3/4, 207 7/8, 208, 208 1/8, 208 1/4, 208 1/2, 208 3/4, 208 7/8, 209, 209 1/8, 209 1/4, 209 1/2, 209 3/4, 209 7/8, 210, 210 1/8, 210 1/4, 210 1/2, 210 3/4, 210 7/8, 211, 211 1/8, 211 1/4, 211 1/2, 211 3/4, 211 7/8, 212, 212 1/8, 212 1/4, 212 1/2, 212 3/4, 212 7/8, 213, 213 1/8, 213 1/4, 213 1/2, 213 3/4, 213 7/8, 214, 214 1/8, 214 1/4, 214 1/2, 214 3/4, 214 7/8, 215, 215 1/8, 215 1/4, 215 1/2, 215 3/4, 215 7/8, 216, 216 1/8, 216 1/4, 216 1/2, 216 3/4, 216 7/8, 217, 217 1/8, 217 1/4, 217 1/2, 217 3/4, 217 7/8, 218, 218 1/8, 218 1/4, 218 1/2, 218 3/4, 218 7/8, 219, 219 1/8, 219 1/4, 219 1/2, 219 3/4, 219 7/8, 220, 220 1/8, 220 1/4, 220 1/2, 220 3/4, 220 7/8, 221, 221 1/8, 221 1/4, 221 1/2, 221 3/4, 221 7/8, 222, 222 1/8, 222 1/4, 222 1/2, 222 3/4, 222 7/8, 223, 223 1/8, 223 1/4, 223 1/2, 223 3/4, 223 7/8, 224, 224 1/8, 224 1/4, 224 1/2, 224 3/4, 224 7/8, 225, 225 1/8, 225 1/4, 225 1/2, 225 3/4, 225 7/8, 226, 226 1/8, 226 1/4, 226 1/2, 226 3/4, 226 7/8, 227, 227 1/8, 227 1/4, 227 1/2, 227 3/4, 227 7/8, 228, 228 1/8, 228 1/4, 228 1/2, 228 3/4, 228 7/8, 229, 229 1/8, 229 1/4, 229 1/2, 229 3/4, 229 7/8, 230, 230 1/8, 230 1/4, 230 1/2, 230 3/4, 230 7/8, 231, 231 1/8, 231 1/4, 231 1/2, 231 3/4, 231 7/8, 232, 232 1/8, 232 1/4, 232 1/2, 232 3/4, 232 7/8, 233, 233 1/8, 233 1/4, 233 1/2, 233 3/4, 233 7/8, 234, 234 1/8, 234 1/4, 234 1/2, 234 3/4, 234 7/8, 235, 235 1/8, 235 1/4, 235 1/2, 235 3/4, 235 7/8, 236, 236 1/8, 236 1/4, 236 1/2, 236 3/4, 236 7/8, 237, 237 1/8, 237 1/4, 237 1/2, 237 3/4, 237 7/8, 238, 238 1/8, 238 1/4, 238 1/2, 238 3/4, 238 7/8, 239, 239

A Wonderful Radio Achievement!

The First All-Glass Socket

Countless tests have proven glass to be the most effective insulation available to radio. After exhaustive research, our engineers have developed a new-idea Socket made entirely of VIRALON — a special glass processed for 100% electrical efficiency.

VIRALON Glass is heat resisting and moisture proof, and unaffected by those influences that commonly make rubber, rubber derivatives, porcelain and vitreous products so inefficient.



Duray All-Glass Sockets eliminate most of the so-called "tube noises" — cut down power losses — prevent short circuits — and eliminate radio frequency leakage.

DURAY RADIO CORPORATION

Dept. 21, 263 Washington Ave., Newark, N. J.

DURAY
ALL-GLASS
VIRALON
SOCKET

You'll like all the exclusive Duray features—the all-glass construction—the one-piece contact springs — the knurled contact spots (corrosion-proof) — the handy soldering terminals.

Price \$1.25 (standard size)
Packed in attractive carton

Until all dealers have been stocked, you can be supplied direct from the factory at the retail price, plus 10c each for packing and postage.

The Prize Winner

Roller-Smith Company,
New York, N. Y.

Rockville Center, N. Y.
August 25, 1924.

Dear Sirs:—

I am sending herewith the photo that I promised. The show at which this set was awarded first prize was run by the 2nd District Executive Council, March 3rd to 7th, at the Hotel Pennsylvania, New York. The prize was awarded for the best appearing, best designed and best constructed amateur transmitter. Judging from the number of sets that were entered in this contest I feel sure that your attractive looking meters had a good deal to do with the choice of the judges.

The meters on this transmitter have been in service for the past three or four years and at no time have I had any trouble with any of them. They have given most exceptional service under severe working conditions. This set has been reported heard in Los Angeles, California, and Porto Rico and also many other distant points.

Very truly yours,

CARLOS CLARK (2-ABD)

CC/DS

P. S. Second prize was won by Mr. Van Duyne (2-AVU) with a 15 watt transmitter fitted up with all Roller-Smith meters.

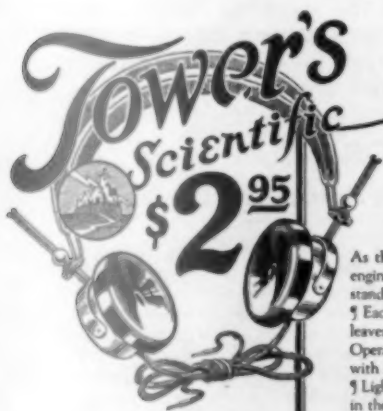
Bulletin AG-10 tells about Roller-Smith 3½" instruments for radio sets, both transmitting and receiving. A copy is yours for the asking. Address

ROLLER-SMITH COMPANY
Electrical Measuring and Protective Apparatus

16 Park Place
NEW YORK, N. Y.

WORKS
Bethlehem, Pa.

Offices in principal Cities in U. S. A. and Canada, also in Havana, Cuba.



Two Towers

As the Eiffel Tower stands as a monument to skilled engineering construction so TOWER'S Scientific phones stand as a monument to supreme radio achievement. ¶ Each phone is carefully tested and approved before it leaves the factory by a Government Licensed Radio Operator thus guaranteeing perfection in tone quality with a positive uniformity of volume. ¶ Lightest of all in weight (only 8½ oz.) they do not catch in the hair and are unusually easy to adjust conforming gracefully to the head.

If your dealer cannot supply you, order direct, we will ship immediately Parcel Post C.O.D.

THE TOWER MFG. CORPORATION
96 BROOKLINE AVE. Dept. G BOSTON, MASS.

MILLIONS are enjoying music and entertainment reproduced in clear, mellow tones, characteristic of TOWER'S Scientifics.



One of the seven wonders of the world.— The Eiffel Tower built in 1887-89 on the Champ-de-Mars contains 3 stories. Reached by a series of elevators, the platform at the top being 985 feet above the ground. In the top story is located the powerful Broadcasting Station F.L.

The World's Greatest Headset Value

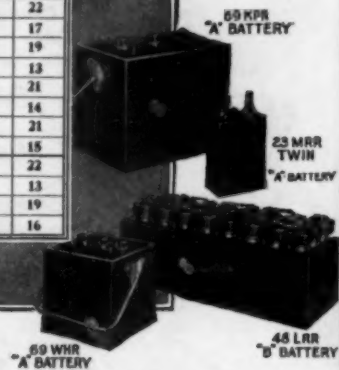
Prest-O-Lite

RADIO CHART

Voltage of Tubes	No. of Tubes	Type of Tubes (see foot-note)	Total Rated Amperes (Mean)	Recommended Prest-O-Lite "A" Batteries	
				Order by Ampere Type	Days Between Charge
5-Volt Tubes C-300 and UV-200 are interchangeable C-301A, UV-2 and UV-201A are interchangeable	1	UV-200	1	69 WHR	22
				or 67 WHR	16
	2	UV-201A	1½	67 WHR	33
	2	1 UV-200 1 UV-201A	1½	611 WHR	22
				or 69 WHR	17
	3	UV-201A	¾	69 WHR	29
				or 67 WHR	22
	3	1 UV-200 2 UV-201A	1½	611 RHR	21
				or 69 WHR	14
	4	UV-201A	1	69 WHR	22
				or 67 WHR	16
	4	1 UV-200 3 UV-201A	1¾	613 RHR	22
				or 611 WHR	15
	5	UV-201A	1¾	611 WHR	22
				or 69 WHR	17
	5	1 UV-200 4 UV-201A	2	613 RHR	19
				or 611 WHR	13
	6	UV-201A	1½	611 RHR	21
				or 69 WHR	14
	8	UV-201A	2	69 KPR	21
				or 67 KPR	15
				or 69 KRL	22
			2¾	67 KPR	13
				or 69 KRL	19
			2½	69 KPR	16

Copyright, 1939
The Prest-O-Lite Co., Inc.

For sets using current at a rate higher than 2 amperes.



What size batteries will work best in your set?

THE Prest-O-Lite Radio Chart makes it easy for you to select the right storage battery for best reception, and also arrange the time between chargings to suit your convenience. Illustrated above is a section of the master chart showing Prest-O-Lite "A" Batteries for 5-volt tube sets. If your set has these tubes, you will find, in this chart, the Prest-O-Lite "A" Battery that fits it exactly. Two sizes are recommended, but the larger capacity battery will be found more desirable unless facilities for frequent and easy charging are provided. (The days between chargings are based on an average use

of your set of three hours a day.) Thousands of radio dealers have the complete chart, showing you also how to select "B" Batteries, as well as "A" Batteries for peanut tube sets. You'll prefer Prest-O-Lite Batteries because of their special features designed for better radio reception. Improved separators and plates insure steady, unvarying current and years of life. They're easy to recharge and priced to offer you remarkable savings at from \$4.75 up.

See the Prest-O-Lite Chart at your dealer's—or write for booklet, "How to fit a storage battery to your set—and how to charge it."

THE PREST-O-LITE CO., INC., INDIANAPOLIS, IND.

New York

San Francisco

In Canada: Prest-O-Lite Company of Canada, Ltd., Toronto, Ont.



Low-Loss "Supercoils" Fully Adjustable For All Circuits

"Radio Broadcast's 'Knockout'"

Walter Van B. Roberts' Circuit—
Combining Radio Frequency,
Regeneration and Reflex.
Entered by Mr. Arthur H. Lynch, Editor
"Radio Broadcast"



"Superdyne" Circuit

For 2-3-4 tubes

As described in "Radio World"



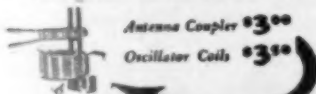
"Tuned Radio Frequency"

(Neutrodyne Type)

Supercoils for adjustable coupling and Low Losses
\$8.00 for Set of Three



"Superheterodyne"



Antenna Coupler \$3.00
Oscillator Coils \$3.00

"Crystal Reflex"

"Harkness" Circuits

Load speaker operation on one tube

Two Transformers—T1 and T2
(Fixed Coupling)



Get your dealer's, or direct, plus p. p.

PERFECTION RADIO MFG. CO.

Room 315, 1520 Chestnut St.,

Philadelphia, Pa.

Send 3—2c stamps for Low-Loss Bulletins and Hook-Ups

GOOD READING MATTER

At Low Cost

This month we offer you twenty-four issues of QST at an unusually low price. In them you are sure to find circuits, new kinks, constructional dope or advertisements which will be just what you've been looking for, and which will be worth many times the price of the QSTs to you.

Here Are the Issues

1917—June, July, August

1919—June

1921—June

1922—May, July, October

1923—February, May, July, August, September, October, November

1924—April, May, June, July, August, September, October, November, December.

Here Is the Price

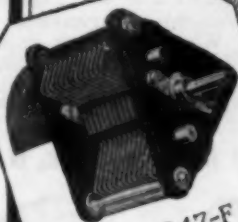
The above 24 issues sent post-paid, only \$2.50. (add \$1.00 for postage if you live outside the American Postal Union.)

We are low on many valuable issues, so get your order in NOW and be sure of getting the full set, as substitutions of other issues may have to be made on orders received after some numbers are exhausted.

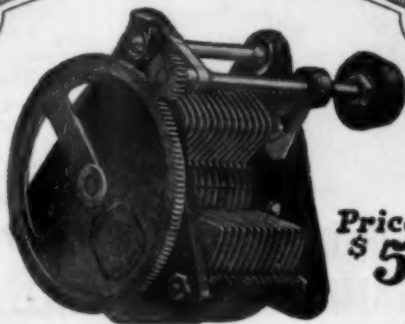
QST CIRCULATION DEPARTMENT

1045 Main St., Hartford, Conn.

GENERAL RADIO Condensers



Type 247-F



Price
\$5

Type 247-H



Type 247-G

The Standards of Excellence Since 1915

THE original low loss condenser was introduced in 1915 by the General Radio Company.

This instrument heralded an era of rapid advancement in the science of radio.

Today the design and performance of the General Radio Type 247 Condensers merit their distinction as the standards of excellence.

Eight different models are now available for various radio requirements. All of these models incorporate the following features, which contribute to lower losses and greater efficiency:

Low resistance losses, because of soldered plates.

Straight line plates, which give a uniform wave-length variation.

Plates always in perfect alignment, being individually straightened before assembly in a jig, and firmly soldered while in position.

Rotor plates counterbalanced to permit greater precision of adjustment.

Mechanically rugged design, which insures faithful performance over long periods of use.

Tight and smooth running spring bearings, adjusted to compensate for wear.

Popular prices, made possible by large-scale production and efficient methods.

Ask your dealer or write for instructive folder "Quality Condensers," containing complete information on all 8 models of General Radio Condensers.

The red cartons with the General Radio label are your unfailing assurance of satisfaction.

GENERAL RADIO Co.
Cambridge, Mass.



Low Power is O.K. if Conditions are Right



2CRQ, Robert L. Koerner, is one of the best low powered amateur stations in New York City. This Reinartz 10 watt transmitter has been heard in forty-five states, Porto Rico and Buenos Aires. Leading amateurs everywhere know that if conditions are right—the results will be good. There is a Weston Indicating Instrument to meet every Radio need whether it be for Reception or Transmission. Voltmeters, Ammeters, Milliammeters, Thermo-Ammeters and Thermo-Galvanometers, in low or high range or in small or large size are available for the amateur, advanced experimenter or commercial station. Whatever your special requirement or problem may be, get in touch with us and let us send you full particulars and prices on the instrument or instruments exactly suitable to your needs.

WESTON ELECTRICAL INSTRUMENT CORP., 158 Weston Ave., Newark, N. J.



STANDARD THE WORLD OVER
WESTON
Pioneers since 1888



We Have the
"Hard to Get" Things!
For Your Transmitter

AMRAD	
"S" TUBES	Price \$10 ⁰⁰
Type 4000-1	
W. E. TRANSMITTING TUBES	
New Type 50 Watts	\$32 ⁰⁰
Limited Quantity at Special Price	
V. T. 1 and V. T. 2 \$6.00 each	
JEWELL METERS	WESTON METERS
Large Bakelite Panels	R. C. A. Inductances
WESTINGHOUSE DYNAMOTORS	

PYREX	Insulators
	All Sizes
Pyrex 5 Watt Sockets	R. C. A. 50 Watt Sockets
R. C. A. TRANSMITTING TUBES	
203 A-50 Watt	\$32 ⁰⁰
Limited Quantity—Special Price	
U. V. 202, \$7.30	
R. C. A. and Acme Plate and Filament Transformers	
General Radio Wave Meter Coils for Short Waves	

Write us for Price List and Information Blank

Troy Radio Company
 1254 ST. JOHNS PLACE BROOKLYN, N.Y.



And its tone quality is unequalled

One Owner's Experience

*47 stations
in one night*

Mr. T. A. Keen, of Temple, Texas writes us as follows: "We have set up our Deresnadyne and logged 47 stations in one night. They range from Havana to Calgary and from Springfield, Mass. to Portland, Oregon. You can see from this that the Deresnadyne is all that is claimed for it."

Heretofore in speaking of the Deresnadyne we have talked about selectivity. For without selectivity a radio set is practically useless.

But perhaps the most remarkable feature of the Deresnadyne is its absolute fidelity of reproduction. It is noted for the absence of undesired noises. Its mellow tone is not equalled by any set. It maintains its mellowness even when operating at full volume.

The striking thing about the Deresnadyne is that it does not sacrifice one essential quality for another. When you buy it you do not choose between tone on the one hand and power on the other. You buy a set that combines both.

The Deresnadyne is not a Neutrodyne. It is not a Heterodyne. Based on a new principle—that of Deresonation—it is unlike any other set on the market, both in principle and results. Buy it at your dealer's.

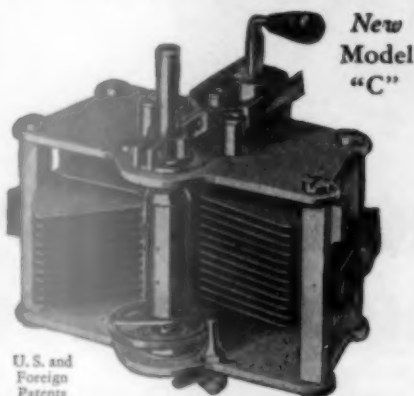
De Luxe Model \$165 without accessories

Andrews Deresnadyne DÈ-RÈS-NÀ-DÏNE · PATENTS PENDING Radio Receiving Set

ANDREWS RADIO COMPANY, 327 S. LA SALLE STREET, CHICAGO

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS

For Better Radio **Hammarlund** PRECISION CONDENSER



U. S. and
Foreign
Patents

THE more you know about the technical requirements of radio, the more you appreciate the technical refinements of the Hammarlund New Model "C" Condenser.

It is an instrument of laboratory precision sold at a popular price by the better radio dealers. All capacities; plain and vernier.

See it at Space No. 12, Amateur Radio Show, Pennsylvania Hotel, New York, March 2nd to 7th, 1925

HAMMARLUND MANUFACTURING CO.
424-438 West 33rd Street, New York

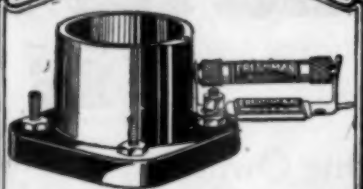
9 points of superiority

- 1—Soldered brass plates, chemically treated against corrosion; perfect alignment.
- 2—Stator plates specially shaped for easy tuning of low waves.
- 3—Adjustable ball-bearing rotor shaft, grounded through metal end-plates.
- 4—Soldered clock-spring pigtail, with automatic stop.
- 5—Minimum dielectric; losses too small to be measured.
- 6—Rugged, compact construction; cannot warp.
- 7—Micrometer cam-vernier moves all plates; knob or lever control; no backlash.
- 8—Takes any size dial.
- 9—The product of 14 years' experience, making precision instruments.



No Leads, Low Loss!

**THE ONLY
PERFECT MICA
GRID CONDENSER
FRESHMAN**



**Fits right on the Binding
Post of the Detector Tube**

It is both a grid condenser and a perfect grid leak mounting, made in .00015, .00025, .0005.

At your dealers, otherwise send purchase price and you will be supplied without further charge.

Chas. Freshman Co. Inc.
Radio Condenser Products

FRESHMAN BUILDING
240-248
W. 40th St.,
New York



DeForest
License



Honeycomb Coils

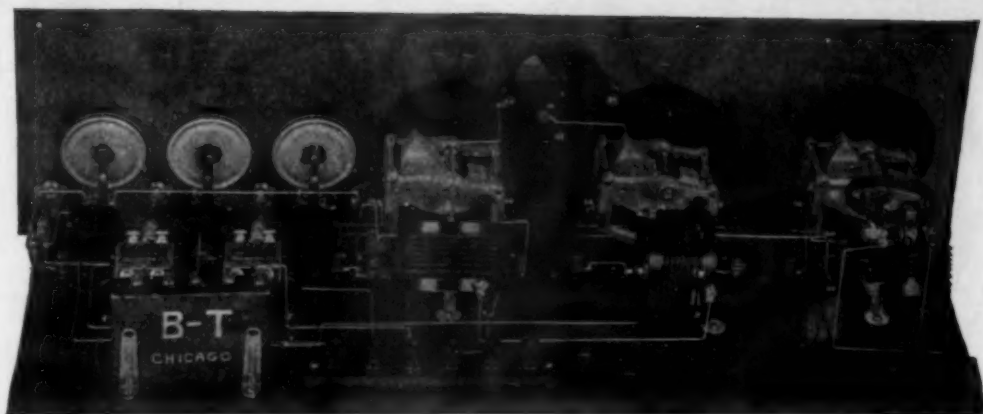
**Back and Front
Panel Mountings
Plain or Geared
Genuine Bakelite**

The Universal all-wave inductance—accepted as standard in regard to superior construction and electrical units of measurement. Ask your "Old Timer" radio friend why sets using honeycomb coils are better; they give closer tuning, greater selectivity and range. No dead end losses, easy to operate. 16 sizes, mounted and unmounted. Interchangeable with all mountings. Be sure the set you buy or build has them.

Send 25c for Super Heterodyne, Radio Frequency and Honeycomb Coil Circuits and Complete Catalog.

Chas. A. Branston, Inc.,

Dept. 3—815 Main St., Buffalo, N. Y.
In Canada—Chas. A. Branston, Ltd., Toronto



The New B-T Low Loss NAMELESS!

Hams and B. C. L's, you get more radio miles for every dollar that you invest in the B-T Nameless than you do in any other five tube receiver on the market today.

This regenerative, R. F. circuit is unusually responsive over the entire new broadcast spectrum as the amplifiers are held constantly near the point of oscillation by one, panel-controlled, three plate condenser.

The 200 to 565 meter wave band is covered by using only 250 M.M.F., straight-line wave length, B-T Laboratory Condensers in conjunction with the skeleton insulation, bank wound, B-T 3-Circuit Transformers.

Low dielectric losses and low distributed capacity, plus the high ratio of inductance to capacity, make this a very sensitive, selective receiver. The simplicity of the circuit makes it easy and inexpensive to construct. Touch control, hair-line separation and perfect tone and volume qualities make operation a real joy. See the new B-T Nameless Kits at your dealers. Write us for circular RF-32 containing more detailed information on this remarkable circuit.



\$26⁵⁰

B-T Low Loss Nameless Kit No. 3
Contains three B-T 3-Circuit Transformers, three 250 M.M.F. B-T Laboratory Condensers, one 40 M.M.F. Control Condenser with 2" dial and a complete set of full size blue prints, instructions and list of other necessary parts.

\$10.50

B-T Low Loss Nameless Kit No. 1
Contains three B-T 3-Circuit Transformers only. Blue prints for Nameless Circuit can be purchased separately for \$1.00.

BREMER-TULLY MFG. CO.

"Pioneers of Better Tuning"

532 S. CANAL ST.

CHICAGO, ILLINOIS

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS



PRICES			
PZ	Indicates panel type with switches.		
CE	is plain type without switches.		
Voltage	W. A. H.	Type P.	Type CZ
130	2500	\$36.00	\$33.00
100	2500	27.50	24.50
70	2500	21.50	18.50
45	2500	18.00	14.50
23 1/2	2500		7.50
KIC-O Chargers			
Type K-1	Single un-mounted		\$1.50
Type K-2	Single mounted		3.50
Type K-3	Multi-Polar mounted		3.00
KIC-O Special Charge	Chemicals (one cell)		.50
New KIC-O "VB" battery and Double Potential charger			

Let KIC-O Batteries help you to get those far-away stations

The real thrill for a true radio fan comes when he tunes in on a new station further away than any he has ever heard before. That is one of the reasons why we are continually receiving hundreds of letters of high praise for KIC-O Storage "B" Batteries. Each letter proves more conclusively the unrivalled superiority of the KIC-O for better, clearer, truer radio reception.

Nickel-zinc construction of KIC-O elements preserved by a special alkaline solution give KIC-O Batteries practically unlimited life. They give an even, dependable discharge over long periods of service and are not harmed by idleness or overcharging.

And with the KIC-O single or double potential charger which charges the battery from any 110 volt A.C. lighting line you will have a real permanent power plant which will last for years.

Write for full details describing the new Multi-power unit, telling why KIC-O units are better than dry cells, "B" eliminators and acid "B" batteries.

KIMLEY ELECTRIC COMPANY, Inc.

2666 Main Street,

Buffalo, New York

See your dealer or CLIP THE COUPON

KIMLEY ELECTRIC CO., INC.,
2666 Main St., Buffalo, N. Y.

Gentlemen:

Please send items checked below to undersigned address:

KIC-O "B" Battery type.....
Voltage..... Price.....
KIC-O Charger (specify which).....

Full information regarding KIC-O equipment. Send C. O. D. subject to guarantee of satisfaction or money back to:



SHIPPED
PARCEL POST
C. O. D.

"ROICE" Radio Tubes

The Royalty of Radio Tubes. A powerful and durable tube that will greatly improve reception, increase range and volume with a maximum of clearness. Our direct sales plan enables you to buy "Roice" at the lowest possible price.

Type-2005 Volts, 1 Ampere Detector Tube
Type-201-A3 Volts, .25 Ampere Amplifier and Detector
Type-1993-4 Volts, .06 Ampere Amplifier and Detector
Type-199A3-4 Volts, .06 Ampere with Standard Base Amplifier and Detector
Type-12	1 1/2 Volts, .25 Ampere Platinum Filament Amplifier and Detector

ALL TYPES \$2.00

Type-2025 Watt, Transmitters, \$3.00

EVERY TUBE GUARANTEED

to work in Radio Frequency, especially adapted for Neutrodyne, Reflex and Super-Heterodyne Sets. When ordering mention type.

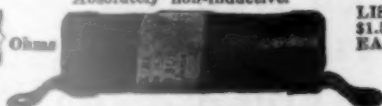
ROICE TUBE CO. (Dept. S) 21 NORWOOD ST., NEWARK, N. J.

CRESCENT LAVITE RESISTANCES

Absolutely non-inductive.

12,000
48,000
50,000
100,000

Ohms



LIST
\$1.50
EACH

Special resistances to order \$2.50. When better resistances are made they bear the Crescent label.

CRESCENT RADIO SUPPLY CO.

1-3-5 Liberty St.,

Jamaica, N. Y.

74

Copper-Brass & Fibre in Sheets, Rods & Tubes.

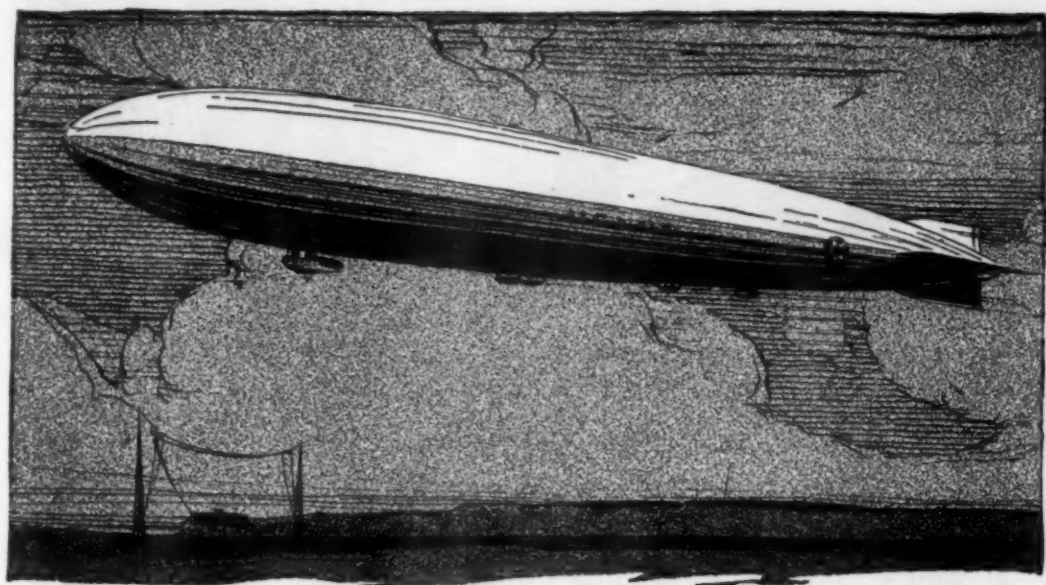
Machine Screws, Dies, Taps, and Drills.

ANGIERS, U. S. A.

MONROE STREET PLANT

STREATOR, ILLINOIS.

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS



Dubilier Condensers

Important Links between the Shenandoah and Land!

Communication with land—under all conditions—at all times—this was the imperative need of the Shenandoah on its experimental flight across the continent. Impressed with this need, army and navy engineers equipped both transmitting and receiving sets with Dubilier mica condensers—not specially designed condensers but the regular standard product. Only complete confidence in the supreme reliability and efficiency of Dubilier condensers can explain their use in the important and daring adventure.

Dubilier

CONDENSER AND RADIO CORPORATION

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS



Notice the rich finish
on this panel
built to order for radio

A SURFACE that is good-looking and useful too. That was one of the demands we made of the engineers who developed Radion especially to order for radio purposes. The high-polished, satin-like finish of Radion Panels does more than add to the beauty of your set. It keeps out dirt and moisture, thus preventing the possibility of causing short circuits from this source and reducing good reception.

Lowest losses and greater efficiency

BUT THE worth of Radion is not just on the surface. Authoritative laboratory tests give it the highest rating as radio-frequency insulation. It reduces surface leakage and leakage noises. This means lowest losses and greater efficiency, especially noticeable in super-sensitive circuits.

Radion Panels resist warping. It's the easiest material to cut, saw or drill. It comes in eighteen stock sizes and two kinds, Black and Mahogany.

Better performance will make it worth your while to ask for Radion by name and to look for the stamp on the panel and the name on the envelope. Radio dealers have the exact size you want for your set.

Send for booklet "Building Your Own Set". Our new booklet "Building Your Own Set", giving wiring diagrams, front and rear views, showing a new set with slanting panel, sets with the new Radion built-in horn, lists of parts and directions for building the most popular circuits—mailed for ten cents. Mail coupon today.

AMERICAN HARD RUBBER COMPANY
Dept. L-3, 11 Mercer St., New York City
Chicago Office: Conway Building
Pacific Coast Agent: Goodyear Rubber Co.,
San Francisco Portland

RADION

The Supreme Insulation
PANELS

Dials, Sockets, Binding Post Panels, etc.

American Hard Rubber Company
Dept. L-3, 11 Mercer St., New York City
Please send me your new booklet, "Building Your Own Set" for which I enclose 10 cents (stamps or coin)
Name -----
Address -----
City ----- State -----

76



MORE DISTANT STATIONS

WITH THE **APEX** VERNIER DIAL

Greater range, bigger volume, finer selectivity, less interference. Lasts forever. The one big advance yet made in tuning. Ratio 12 to 1.

Quickly applied to any shaft.

For sale by all good Radio Dealers.

If unable to obtain from dealer, enclose

\$2.00 for
Royal Brass
Finish.

\$2.50 for
Satin
Silver
Finish.

\$3.50 for
De Luxe
Gold
Plated
Finish.

7 Tube Microdyne Super-Heterodyne for \$97.50

Receive the parts complete to assemble your set. Coast to coast on an 18 in. loop. Assemble this 7-tube Microdyne Super-Heterodyne on a 7 x 18 in. panel in 3 hours. Parts complete. Price of cabinet, to fit, on application. If your radio dealer cannot supply, send check or money order and name of dealer.

The Apex Super Five

is a tuned radio frequency receiver of the highest type. Built into a highly finished walnut cabinet—complete with Jones Multiple Battery Cable—all settings highly gold plated. List price \$95.00 complete.

Apex Electric Mfg. Co.

1410 West 59th Street, Dept 309 Chicago

THE WINDHAM WIRE FORMER

Forms loops for No. 4, 6, 8 and 10 screws, makes easy radius right angle bends, has flat jaws and wire cutters. A complete tool for those who build their own.

Price \$1.25

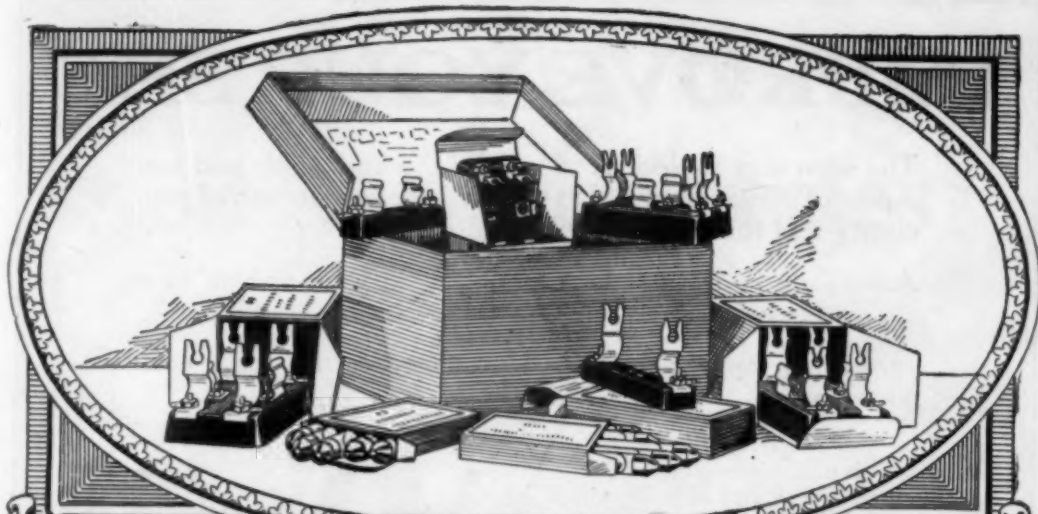
(Patents pending)

THE GOYER COMPANY

Willimantic, Conn.



ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS



RADIO PRODUCTS of DISTINCTION

The DAVEN Resistance Coupled Amplifier Kits



THE DAVEN SUPER-AMPLIFIER UNIT

For those who prefer to buy a complete Resistance Coupled Amplifier Unit rather than build. This unit comes ready to install—it is the neatest and most compact amplifier now offered to the public.

It is laboratory tested and represents the ultimate in amplifier design. The base is of molded Bakelite and is small enough to fit within any cabinet. All connections are hidden beneath the base.

Sold everywhere.

Obtain from your Dealer the "RESISTOR MANUAL," our complete handbook on Resistance Coupled Amplification, 25c. If your Dealer cannot supply you, we will send you one direct, postpaid for 35c.

These highly perfected Resistance Coupled Amplifiers have convinced the most skeptical that Resistance Coupling is matchless. Add the Daven Resistance Coupled Amplifier to your favorite tuner and you will have a worthy combination hard to beat and amplification that is perfect.

The assembly is very simple, while the satisfaction of having built such a perfect device yourself is beyond mere words to describe. Its volume is adequate for all purposes—its perfect tone quality and absolute lack of distortion place it beyond comparison.

These Kits can be purchased at all good Radio Stores—they come with complete instructions for assembly so that the novice will have the same success as would be expected of Radio Engineers. Sockets and mica fixed condensers are not included, but instructions are furnished giving complete information and diagrams. Supplied for either three or four stages.

TRADE MARK
DAVEN RADIO
"The Sine of Merit"
CORPORATION
Resistor Specialists

Newark

New Jersey

"The Aristocrat of Amplifiers"

IMPROVE YOUR SET

The sure way to do it is to rebuild the audio side and use a pair of AmerTrans. Do this, and the utmost in volume, clarity and tone quality will result.

AmerTran is the product of over twenty-four years' specialized experience in transformer building.

Increasing appreciation of its quality comes with continued use.

AmerTran is made in two types, one quality—
AF 6-ratio 5:1 and AF 7-ratio 3½:1.

Buy Them by The Pair!

Price either model \$7.00 at your dealer's.

Send for leaflet giving useful amplifier information.

AMERICAN TRANSFORMER COMPANY

176 Emmet St. Newark, N. J.

"Transformer builders for over twenty-four years"



BLUEBIRD Radio Tubes

Distinctly New and Efficient

Satisfying every radio fan's wish in performance and price. Our direct sales plan enables us to sell at this low figure. "Bluebird" is a sensitive and powerful tube, assuring increased range and clear volume.

Type—200	5 Volts, 1 Ampere Detector Tube
Type—201A	5 Volts, .25 Ampere Amplifier and Detector
Type—199	3-4 Volts, .06 Ampere Amplifier and Detector
Type—199A	3-4 Volts, .06 Ampere with Standard Base Amplifier and Detector
Type—12	1½ Volts, .25 Ampere Platinum Filament Amplifier and Detector

ALL ABOVE TYPES \$2.50

Type—202

5 Watt, Transmitters, \$3.00
Shipped Parcel Post C. O. D. When Ordering Mention Type.
Designed to give best results in all circuits—Radio Frequency, Neutrodyne, Reflex and Super-Heterodyne Sets, etc.

Every Tube Guaranteed

BLUEBIRD TUBE CO., Dept. S, 200 BROADWAY
New York City

HERCULES AERIAL MAST

30 Ft. Mast \$10
40 Ft. Mast \$25
60 Ft. Mast \$45

All steel construction, complete with guy wires and masthead pulley. We pay freight.

S. W. HULL & CO., DEPT. C-4
2048 E 79th St., Cleveland, O.

Write for
Literature
and
FREE
Blueprint

Genuine

Westinghouse Batteries

70 A.H. \$11.00 100 A.H. \$14.00

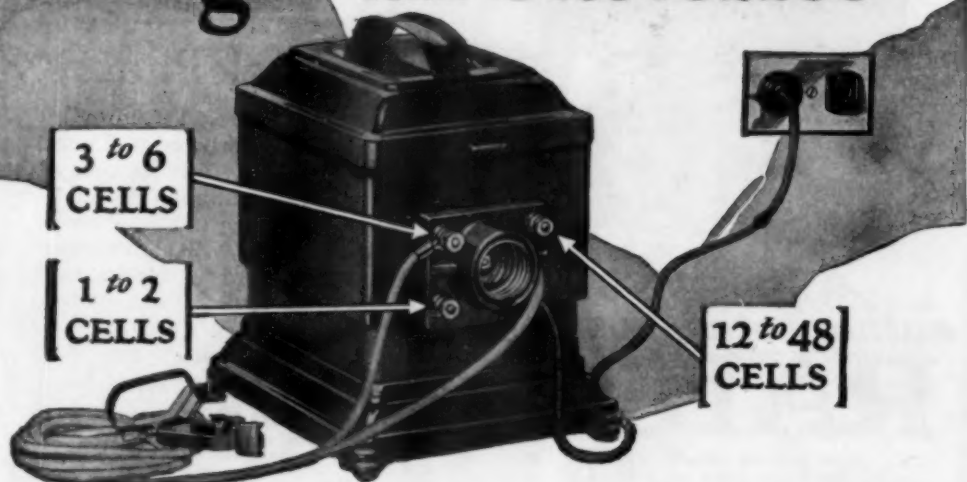
GEORGE VOIGT

56 Maiden Lane Maspeth, N. Y.

Dealers Send for Special Prices

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS

New Model Tungar charges all batteries



The Tungar is a G-E product, developed in the great Research Laboratories of General Electric.

The New Model Tungar charges radio A and B storage batteries, and auto batteries. Two ampere size (East of the Rockies) \$18.00

The Tungar is also available in five ampere size (East of the Rockies) . . \$28.00

60 cycles—110 volts

On the back of the Tungar, there are three terminals. Slip the wire into one and charge your radio "A" battery, 2 or 4 volt size. Use the second to charge your radio "B" battery, 24 to 96 volt size. Or the third will charge a 6 volt "A" battery or 6 to 12 volt auto battery.

Just clip on the Tungar, and plug it into any electric outlet in the house or garage. Then leave it overnight to charge while you sleep. Very simple.

Tungar

Reg. U. S. PAT. OFF.

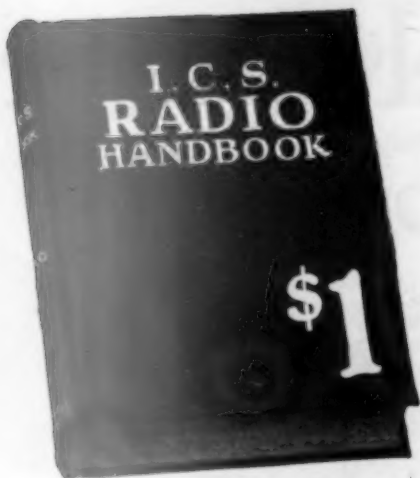
BATTERY CHARGER

Tungar—a registered trademark—is found only on the genuine. Look for it on the name plate.

Merchandise Department
General Electric Company
Bridgeport, Conn.

GENERAL ELECTRIC

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS



A practical, authoritative book on **RADIO**

514 pages. Price only \$1
Compiled by HARRY F. DART, E.E.
Formerly with the Western Electric Co.,
and U. S. Army Instructor of Radio
Technically edited by F. H. DOANE

EVERY member of the American Radio Relay League should have a copy of this I. C. S. Radio Handbook. Price only \$1. Written, compiled and edited by practical radio experts of national reputation. A handy reference book that will help you improve your sending and receiving apparatus. Explains the operation of dozens of circuits. Filled with interesting experiments. Note this list of contents:

Electrical terms and circuits, antennas, batteries, generators and motors, electron (vacuum) tubes, every receiving hook-up, radio and audio frequency amplification, broadcast and commercial transmitters and receivers, wave meters, super-regeneration, codes, license rules. Many other features.

Send the coupon to-day with \$1 and get this 514-page I. C. S. Radio Handbook.

---TEAR OUT HERE---
INTERNATIONAL CORRESPONDENCE SCHOOLS
Box 611-G, Scranton, Penna.

I enclose One Dollar. Please send me—post-paid—the 514-page I. C. S. Radio Handbook. It is understood that if I am not entirely satisfied I may return this book within five days and you will refund my money.

Name.....

Address.....

Check here ☐ and enclose \$1.10 if you wish the deluxe edition, bound in Leatheroid.



Murdock Phones

are backed by 20 years of successful experience. There are over 1,000,000 in use today. Murdocks are famous for distinct reproduction and for their light weight. With the Murdock Multiple Plug you can use from one to four phones at the same time

WM. J. MURDOCK CO.
343 Washington Ave., Chelsea, Mass.

(Free Booklet)

Write for our free booklet "The Ears of Radio". It contains important data on headphones.

MURDOCK RADIO PHONES

Standard since 1904

**5 TUBE
RADIO SET \$38.50**
COMPLETELY ASSEMBLED



**10 DAYS
FREE TRIAL**

Direct from factory to you at less than Dealer's Cost. Marvelous 5 tube radio set. Latest and most efficient TUNED RADIO FREQUENCY circuit. Approved by America's Leading Radio Engineers. Easy to operate. Dials can be logged. Tune in your favorite stations instantly, on the same dial numbers every time. No guessing. Mr. Howard of Chicago said, "While 5 Chicago Broadcasting Stations were on the air, I tuned in 17 out-of-town stations from 40 to 1,000 miles away, on my loud speaker, very loud and clear as though they were all in Chicago." Don't buy a radio set until you learn more about our wonderful Free Trial Offer.

"Write Today for Free Circular"
METRO ELECTRIC COMPANY

400 N. Michigan Ave.,

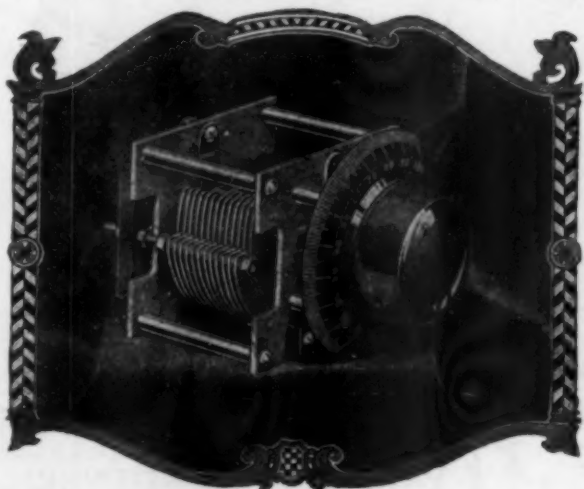
Dept. 22

Chicago

The Claims of Superiority We Make for

National Condensers and Dials

are backed up by radio experts and by thousands of delighted users. They give SUPREME SATISFACTION. You, too, will be surprised and delighted.



NATIONAL CONDENSERS

are a revelation to radio fans. You are losing radio satisfaction every day you are without one. No lost motion or back lash. And none develops with use. Tests at three Radio Shows, during which a National Condenser was driven over a million revolutions, amply demonstrated these claims.

Excellent for DX Reception

PRICES—DX Condenser, including $3\frac{1}{4}$ " Vernier Dial. .001, \$7.25; .0005, \$6.25; .00035, \$5.75; .00025, \$5.75.

NATIONAL DIALS

Velvety smooth; perfect reduction over the entire range.

Enthusiastically approved by radio engineers for precision in tuning.

Ask your dealer to show you a National. Observe the lustrous finish—the graceful lines. Then notice the perfect "Radio Touch."

PRICES—Velvet Vernier Dial 4", \$2.50; $3\frac{1}{2}$ ", \$2.25.



NATIONAL CO., Inc., *Engineers and Manufacturers*

110 Brookline St., Cambridge, Mass.

Sole Licensees for the manufacture of the National Regenaformer under the Browning-Drake patents.

PRECISE INSTRUMENTS

GIVE BEST RESULTS—THEY HAVE NO EQUAL



*Laboratory
Instruments
at Commercial
Prices*

Precise Super-Multiformer No. 1700

The one great advancement that has been made in Super-heterodyne design since the original conception of the circuit. 1 instrument that does the work of 4—replacing all long-wave transformers. Like all other **PRECISE** instruments, this Super-Multiformer is made in strict accordance with the specifications of our Research Engineer, J. L. McLaughlin. This, plus **PRECISE** standards of skill and workmanship is your guarantee of best results. \$20.

Precise Audio Transformer No. 285

In performance this is the most amazing transformer on the market today. The first choice of radio experts everywhere. There is no other like it for volume and perfect reproduction. \$5.00.



Sold by the better dealers

Precise Manufacturing Corporation, Rochester, New York

Branches—33 W. Jackson Blvd., Chicago and 821 Market St., San Francisco

Eastern Sales Office—Niagara Sales Corp., 3-5 Waverly Place, New York City

Southern Representative—Saal Products Sales, Inc., 35 Warren Street, New York City

Canadian Distributors—Perkins Electric, Ltd. - Toronto - Montreal - Winnipeg

Globe Low-Loss Tuners

**Make the
Perfect
Radio Set**

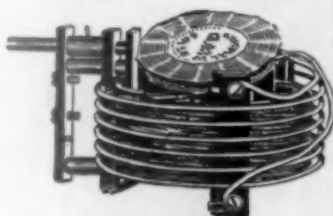
QUALITY — VOLUME — DISTANCE

No Metal
No Eddy Current
Losses

Little Insulation
Low Distributed
Capacity

Large Wire
Self Supporting

Anti-Capacity
Windings
Low R F Resistance



Patented Dec. 9, 1934

GET ORIGINAL GLOBE COILS

PRICES:

Standard Tuner (Broadcast Range).....\$7.00

Short Wave (35-135 Meters).....\$7.00

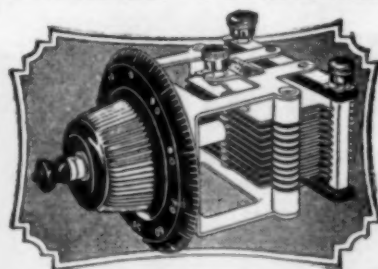
For Superdyne Circuit.....\$8.50

R F Transformers.....\$6.00

Circular on Request. Dealers and Jobbers Write.

Globe Radio Equipment Co.
217 West 125th St., N. Y. C.

The Only True Micrometer Type VARIABLE CONDENSER



A real micrometer permits fine mechanics to measure and make readable adjustments of 1/1000th of an inch or less.

The **BARRETT & PADEN** is the only condenser made that makes use of this principle and divides the adjustment of the movable plates into 1/1000 readable positions.

Think what this means in tuning distant stations.

Dealers write for
name of nearest
jobber.

.0005 } \$6⁰⁰
.00035 }
.00025 }

BARRETT & PADEN
1314 SEDGWICK ST. CHICAGO, ILL.

**No. 2-A
Loud Speaker**

Price **\$17.50**

including 5-foot
cord and plug



No. 3-A Head Set

Price **\$5.50**

Rich Tone and Volume

The Stromberg-Carlson No. 2-A Loud Speaker reproduces programs with naturalness of tone while its volume is sufficient to fill a large room on distant station reception.

Graceful in design; soft oxidized silver finish; so light it may be carried from place to place. Simple and economical to operate. Requires neither extra batteries nor extra stages of amplification.

Stromberg-Carlson Head Sets and Loud Speakers have powerful magnets and layer wound and layer insulated coils—a superior type of construction.

Ask your Dealer

Stromberg-Carlson Telephone Mfg. Co.

1060 University Ave., Rochester, N. Y.

Stromberg-Carlson



THE WC-12
Console

"Average Reception" That's What Counts

It's the way distant stations come in on "average nights"—yes, even on "bad nights" that determines the value of the set you buy. It's *not* its performance on *ideal* nights.

The Radiodyne surprises even the expert with its amazing selectivity—its exceptional tone clarity and unusual volume. The Radiodyne is not a prima donna that suffers from temperament.

A Few RADIODYNE Type WC-12 Features

Tunes Sharply Thru
Local Stations
Uses 6 Dry Cell Tubes
Receives from Great Distances
Has Wonderful Volume
Exceptional Clarity
Batteries self contained in beautiful
two-toned Mahogany Cabinet

Models Priced from \$65 to \$250

Everyone a Radiodyne

Everyone Worth the Money

Write for Booklet

WESTERN COIL and ELECTRICAL CO.

305 Fifth Street, Racine, Wisconsin

*If you can get it with any set
you can get it Better with the*

Radiodyne

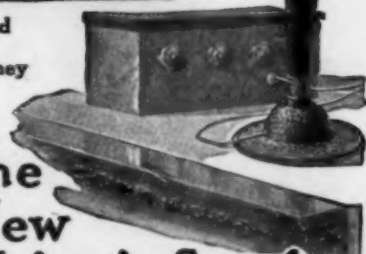
"The Voice of the Nation"

**10 Days
FREE
TRIAL**

**Only
\$8.50**

**UNCONDITIONALLY
GUARANTEED 1 YEAR**

**Send
No
Money**



The New Majestic Speaker

The Last word in Radio Re-Creation

Embodies all proved principles of reproduction. Delicate shading, inflection and modulation of voice—this and the musical instrument re-created with remarkable volume and clarity of tone, with astounding purity and faithfulness, even when sending is weak. **Floods room with best that's in your set.** Horn acoustically perfect. No battery needed—simply plug in like headphones. Handsome crystalline finish fibre horn approx. 25" high; heavy base prevents tipping. Polar indicating connecting cord included.

You Save Middlemen's Profits

Send direct—today—for your Majestic Speaker. Try it for ten days. Hear distant stations plainly. Test its clarity of tone and volume—no distortion, no harshness, no rattle, no blare or screech. Compare it with loud speakers selling for \$15 to \$25 and more.

Send No Money Simply pay postman on delivery, after free examination, then if you're not satisfied, simply return it at our expense and back goes your money. You—and you alone—are the judge. Your loud speaker should speak for itself. So mail your order today

JAMES M. DAVIS CO.

20 D Euclid Arcade, Cleveland, Ohio.

Send a Majestic Speaker on your free examination offer.

Name

Address

City..... State.....



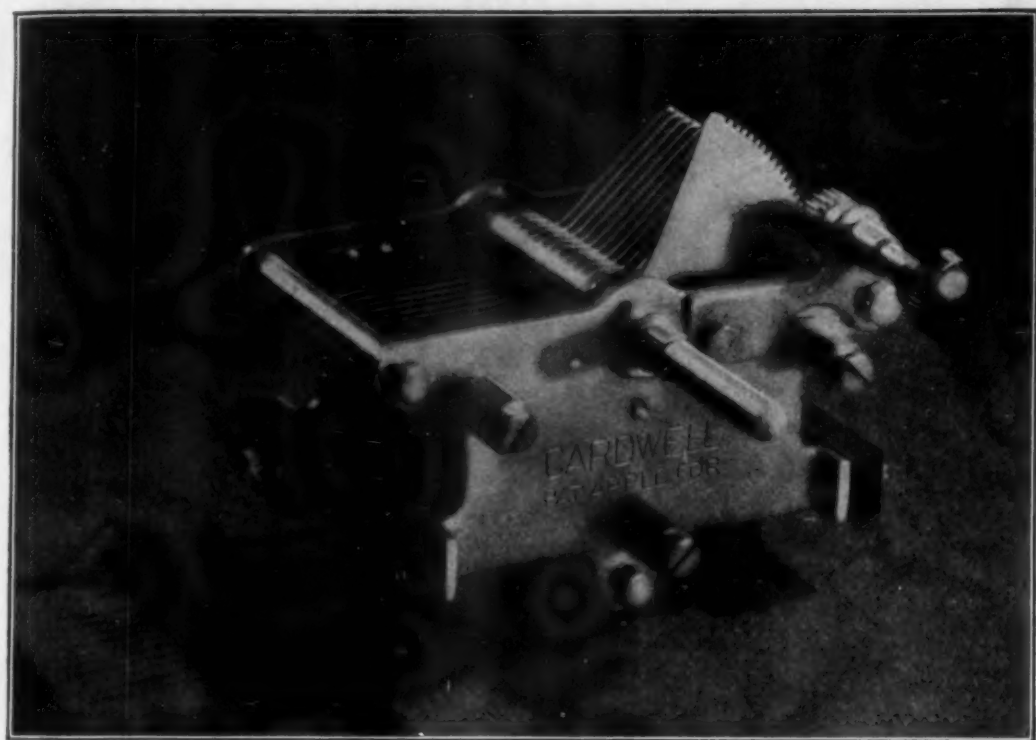
Find Your Radio Trouble With the Milavolt Detector

It generates an Electro-motive-force—0.853 volt. Simply attach to cord tip of your receiver. No danger burning out tubes. For testing through anything from dead short circuit to 1,000,000 ohms. Internal resistance—70,000 ohms. Last for years. Sent C.O.D. to any address in U.S. for \$1.25. Your money back if not all we claim.

ADBRO MFG. CO.

French St.,

Pittsburgh, Pa.



"No fancy gewgaws to attract the eye and cause trouble in the end"

SO writes Mr. Henry M. Neely, Editor of RADIO-IN-THE-HOME. Mr. Neely adds:

"The present-day low-loss condenser approaches more nearly to a perfect instrument, the more nearly it approaches the design and workmanship of the Cardwell."

Simplicity is a distinctive characteristic of the Cardwell. There is no excessive bulk or weight—no intricate parts or complicated assembly.

Other points of merit have been praised by many different experts. In fact, Cardwell condensers have received the universal approval of radio editors and engineers everywhere.

Cardwell condensers are rugged, free

from play, noiseless and remarkably smooth in action. And there is nothing to work loose or get out of adjustment.

Cardwell invented the first "low-loss" condensers—a name originally applied only to Cardwells to distinguish them from ordinary varieties. Cardwell now makes seventy-six different types—a condenser for every requirement. Ask your dealer to show you his assortment.

A postcard brings you an education on condensers. Write today for the new Cardwell Condenser booklet.

The Allen D. Cardwell
Manufacturing Corporation
81 Prospect Street, Brooklyn, N. Y.

CARDWELL
(RADIO UNITS)

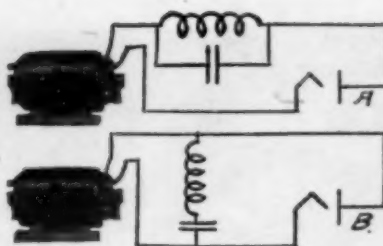


UNITRADS
(OF MERIT)

CONDENSERS — INDUCTANCES — TRANSFORMERS

ALWAYS MENTION Q S T WHEN WRITING TO ADVERTISERS

No 4 of a series of 10
"FILTER FACTS"
Follow these three monthly



$$f_r = \frac{1}{2\pi\sqrt{LC}}$$

f_r = Resonance f.
L = Henries
C = Farads.

SERIES AND PARALLEL RESONANCE. Inductance or capacity when used separately as outlined in No. 2 and 3 of this series are indiscriminate in their action with the exception of the general rule, the higher the frequency the more effective. The combined use of them will result in a filter that will either stop, or pass, one or several frequencies or bands of frequencies. The two basic forms for such combinations are Series Resonance and Parallel Resonance.

SERIES RESONANCE. A choke and a condenser connected in series as shown in B will offer high impedance to all frequencies except one, i. e. resonant frequency (f_r). This frequency, practically speaking, will pass with an impedance of the resistance of the choke only, i. e. better than condenser alone if R is small, but the impedance will be high for frequencies above and below resonance.

PARALLEL RESONANCE. When inductance and capacities are connected in parallel as in A the reverse characteristic of B will prevail. It will pass all frequencies except those near resonance. For resonance frequency it will be a dead stop except to supply the losses which are, practically speaking, negligible.

The effective application of these resonant circuits in their basic forms to generators is rather limited. One for slot ripple and one for commutator ripple will be required, neither one of which will be very effective in reducing moving contact disturbances. Also they are so very discriminate that slight variation in speed, such as caused by varying the load, would require readjustments.

ELECTRIC SPECIALTY COMPANY

TRADE "ESCO" MARK

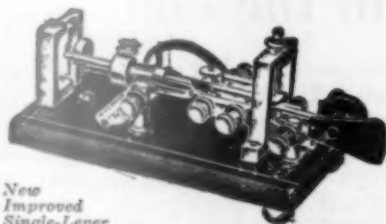
225 SOUTH STREET

STAMFORD, CONN., U. S. A.

Makers of Motor Generators and Dynamotors with the least ripple and the most miles per watt.

Martin's New and Improved VIBROPLEX

Reg. Trade Marks Vibroplex Bug Lightning Bug



New
Improved
Single-Lever

Japanned Base, \$17 Nickel-Plated, \$19

Transmits perfect signals at any desired speed. Easy to learn and operate. Send continuously for hours without fatigue. Used and recommended by more than 85,000 wireless and commercial operators.

Special Large Contacted Vibroplex

Equipped with 3-16 inch contact points to break high current without use of relay\$25.

Sent on receipt of price

THE VIBROPLEX CO. Inc.

825 Broadway, New York

Established 1890

Noiseless
Grid
Leak

40c each in any value
from 1-4 to 16

FRESHMAN
SUPERIOR

You can depend upon them to remain accurate at all times. Made of high resistance material impregnated throughout (not coated paper). Unaffected by climatic conditions. Will not deteriorate. Clamped between solid knurled ferrules assuring rigid construction and firm contact at all times. At your dealer's, otherwise send purchase price and you will be supplied postpaid.

CHAS. FRESHMAN CO., INC.
Freshman Bldg., 246-248 W 46 St., N. Y.

E B Y
BINDING POSTS

Twenty-five
Different
Engraved Tops

They Don't
Lose
Their Heads

H. H. EBY MFG. CO.
Philadelphia

C BAT
B DET

They say~

(continued from last month)

9

THEY SAY OF THE ADLER-ROYAL NEUTRODYNE:

"A Royal will reproduce the tone perfectly. . . . without discordant noises. Compare it . . . in quality of tone reproduction."

Royal amplifies with Thordarsons!

10

THEY SAY OF THE THERMIODYNE:

"If it's in the air, Thermiodyne will get it regardless of distance. No distortion, no howling."

Thermiodyne amplifies with Thordarsons!

11

THEY SAY OF THE PATHE:

"Pure tone — remarkably clear and sweet reproduction."

Pathe amplifies with Thordarsons!

12

THE SAY OF THE MICHIGAN:

"Gives any degree of volume desired — without distortion. Exceptionally mellow tone quality — a tone charm that eliminates harsh or mechanical notes."

Michigan amplifies with Thordarsons!

Follow the Lead of the Leaders! Build or replace with Thordarsons

Leading set builders have scientific laboratory apparatus to test, compare and *prove the facts* about transformers. *They continue to use more Thordarsons than all competitive transformers combined.* Doesn't this answer the amplification question?

Daily we hear from fans who paid high prices for musically named, fancy-looking transformers only to discover that their old standbys—Thordarsons—were the *real* musical instruments. For the benefit of others we therefore repeat "when better transformers can be bought they will be Thordarsons." Few, if any, transformers actually *cost* as much to make as Thordarsons. Why, then, *pay* more? Any store can supply you. If dealer is sold out, order from us.

THORDARSON ELECTRIC MANUFACTURING CO.

Transformer specialists since 1893
WORLD'S OLDEST AND LARGEST EXCLUSIVE TRANSFORMER MAKERS
Chicago, U.S.A.

Unconditionally Guaranteed

THORDARSON *Super* AMPLIFYING TRANSFORMERS *Standard on the majority of quality sets*

TYPES AND PRICES: Thordarson "Super" Audio Frequency Transformers are now to be had in three ratios: 2-1, \$5; 3½-1, \$4; 6-1, \$4.50. Thordarson Power Amplifying Transformers are \$13 the pair. Thordarson Interstage Power Amplifying Transformers, \$9. Write for latest hook-up bulletins—free!



ZENITH
KENNEDY
RADIODYNE
THERMIODYNE
ULTRADYNE
MURDOCK
QZARKA
Pfanstiehl
MICHIGAN
Deresnadyne
MALONE LEMON
MASTER RADIO
ROYAL
Howard
Pathe
HARMONY
AUDIOLA
GLOBE
EAGLE AND
MANY OTHERS

Super-Het Builders!

For the "Best" 45,000 Cycle Super-Heterodyne, "RADIO" and other leading publications recommend in highest terms the Thordarson 2:1 radio transformers. Take no others!

ALWAYS MENTION Q S T WHEN WRITING TO ADVERTISERS



Price
\$1
Postage
Paid

A Wrench Set That is Right

This compact socket wrench set consists of a strong screw driver type handle with hex shank and six high grade steel, machined, sockets, five to fit the hex nuts and one taper knurled socket for battery nuts. All packed in a durable, hinged box with a place for each socket and the handle.

Radio Fans—"This set will set the nut" quickly and easily and is as handy as your right hand.

Send in the coupon and your dollar today for the set that's worth much more.



The New Britain Machine Co.
New Britain, Conn.
I need this set. Enclosed find \$1.00

Name.....
Street.....
City..... State.....

FINDLAY Stand-Off Insulators

"For Perfect Reception"



Designed especially for radio purposes. Will hold lead-in wire six inches from building. Corrugated so that it will drain quickly. Will not deteriorate. Made entirely of porcelain, the dependable insulation. Easy to install. Packed in cartons with padded screws ready for installation.

Price, 50c

ON SALE at all leading radio stores. Mail orders accepted at factory when accompanied by cash or money orders.

All types of porcelain radio insulators and insulated screw hooks. Send for circular.

No. 1028

MANUFACTURED BY
The Findlay Electric Porcelain Co.
FINDLAY, OHIO

Imported Transformers

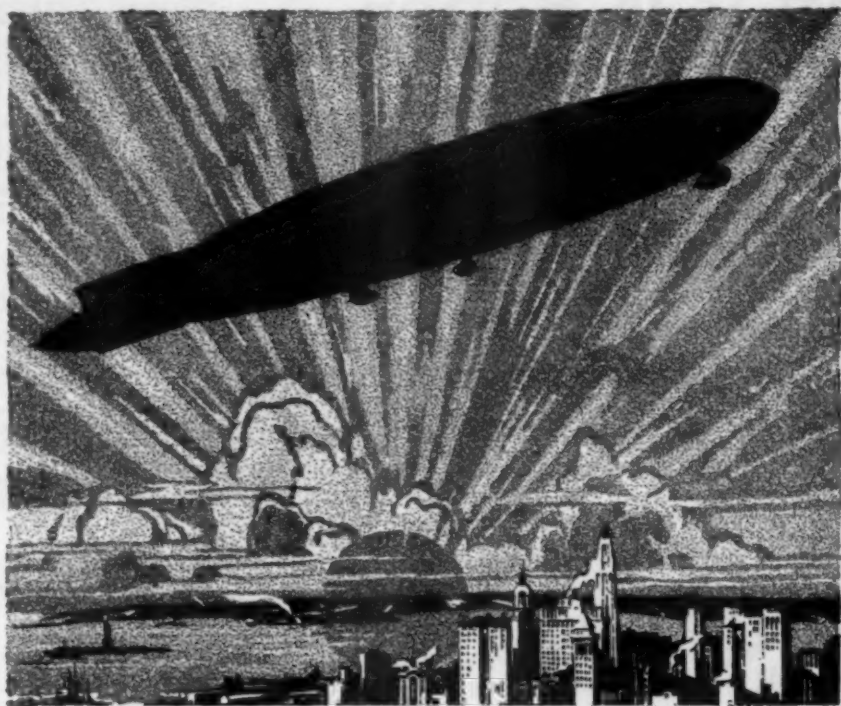


Special
for
the
"HAM"

Transformers with a kick. 40-1 Ratio. Especially designed in the D.T.W. Berlin Laboratory by a well known American amateur.

Price \$6.00 by Parcel Post

Sole American Distributor
Tobe C. Deutschmann
46C Cornhill Boston, Mass.



SHENANDOAH -- INDIAN WORD MEANING "DAUGHTER OF THE STARS"

When the "Daughter of the Stars" talks with the children of earth

YOU remember the dramatic night last winter when the giant Navy dirigible Shenandoah went adrift in a raging gale.

"You are over Newark," said radio station WOR. "What can we do to help you?"

Thousands of people sitting by radio sets in their cozy homes heard the plucky lieutenant-commander on the Shenandoah send back the reply: "Thanks, old man, everything's O. K."

In the air, as on the sea, radio equipment must be the most reliable it is possible to get. That is why the Shenandoah, the huge ship Leviathan — in fact, many govern-

ment and commercial radio plants — were equipped with Exide Batteries.

For your own set

When you use Exide Radio Batteries in your home you get the clearest reception, for Exides give uniform current through a long period of discharge.

There is an Exide type for every tube and a size for every set: "A" batteries for 2-volt, 4-volt and 6-volt tubes; "B" batteries, 24 and 48 volt, of 6000 milliamperere hour capacity. They are efficient, dependable, long-lasting — and right in price. Exide Batteries are made by the largest manufac-

turers of storage batteries in the world.

You can get Exides at Radio Dealers and at all Exide Service Stations. If your dealer should be out of booklets describing Exide Radio Batteries, send us your name and we will mail them to you.

THE ELECTRIC STORAGE BATTERY COMPANY

Philadelphia

Exide Batteries of Canada, Limited
153 Dufferin St., Toronto



The new Exide 6-volt "A" battery in one-piece case.

Exide

RADIO BATTERIES

FOR BETTER RADIO RECEPTION USE STORAGE BATTERIES
ALWAYS MENTION Q S T WHEN WRITING TO ADVERTISERS

Why it is Better

"MASTER of Every Note in the Orchestral range" is the proven claim of the Federal No. 65 Audio Frequency Transformer:—Volume without distortion is the basis for the beauty of Federal Tone.

From its oversize locking nuts to its heavy brass mounting feet the Federal No. 65 Transformer incorporates the same engineering skill that has made Federal the recognized leader in electrical communication apparatus since 1890.

Insist upon Federal parts for your "pet" hook-up. There are over 130 standard parts bearing the Federal iron-clad performance guarantee.

**FEDERAL TELEPHONE
MANUFACTURING CORP.,**
Buffalo, N. Y.

Boston New York Philadelphia
Chicago Pittsburgh San Francisco
Bridgeburg, Canada



Federal
Standard RADIO Products

Oversize locking nuts, slotted for screw driver, eliminating use of pliers to tighten

Large laminated silicon steel shell type core.

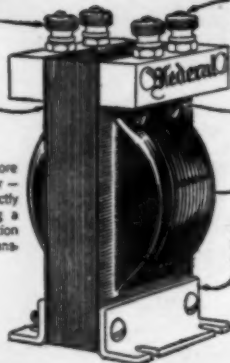
In general the larger the core the better the transformer—Federal No. 65 weighs exactly 1½ pounds—guaranteeing a tonal quality and modulation pre-eminent among transformers.

Primary and secondary fed thru hollow screws and dip-soldered making complete protection against breakage or shorts.

Only highest grade genuine varnished cambric tubing used.

Black enameled shield, completely surrounding windings

Heavy nickel plated brass mounting feet—2 screw slots and 2 screw holes for mounting.



The Andrews Paddlewheel-Coil

Pats.
Pend



Price
\$3.00

A new low loss coil of ideal characteristics for use with many different types of circuits. Embodying, as it does, an extremely high ratio of inductance to resistance it constitutes a marked advance in radio design.

Your results will be greatly improved by using this superior piece of apparatus. Its exclusive construction assures maximum amplification, minimum distortion, and much greater selectivity.

This coil, which is the type employed in the ANDREWS DERESNADYNE RECEIVER, is manufactured under license from the Andrews Radio Co.

Write for full information regarding this wonderful new coil, its characteristics, and its uses.

DUO-SPIRAL FOLDING LOOP

Handsomely finished in silver and mahogany. A special model for every circuit. Rotates on base, which has silvered dial graduated for calibration. Handle permits adjustment without body capacity effect. A finer and more convenient loop aerial for portable and non-portable sets. Write direct, if your dealer cannot supply you.



Price
\$8.50

Pats.
Pend

RADIO UNITS, Inc.

1304 FIRST AVE.,

PERKINS ELECTRIC, Ltd., MONTREAL

MAYWOOD, ILL.

from Coast to Coast
from Gulf to Hudson Bay

BRACH

vacuum arresters
have protected

principal Railway Signal
Systems, Police and
Fire Circuits, and

RADIO

for 18 years

Approved by National Board
Fire Underwriters
No. 1082



SAFETY
demands the
BRACH

vacuum radio arrester

L. S. BRACH-MFG. CO. NEWARK, N. J.

Send for printed matter concerning

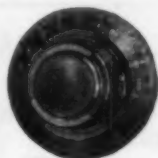
THE GOODMAN

the niftiest short-wave tuner on the market. Made by L. W. GOODMAN, Drexel Hill, Pa. Gene Hummer Sta. 4UA, pictured on page 50, December QST had KGO as early as Sept., at Dundee, Fla., on his GOODMAN tuner. Get that—Sept.—Fla.—Calif. Not so bad!

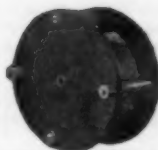
Bakelite - Faultless servant of Radio's invisible audience



BAKELITE combines properties which make it unique among insulating materials. It has high insulation value and great strength, resists both heat and cold, and is immune to moisture, oil and fumes. Bakelite is unaffected by time and use, and its color and finish are permanent.



Na-ald Dial



Rathbun
Condenser



Na-ald Tube
Socket



R. C. A. Tube Base

8527-B

Radio has banished isolation. It has brought the music of opera and orchestra, the voices of statesmen and teachers into the cabin of the woodsman, the home of the farmer and to people everywhere.

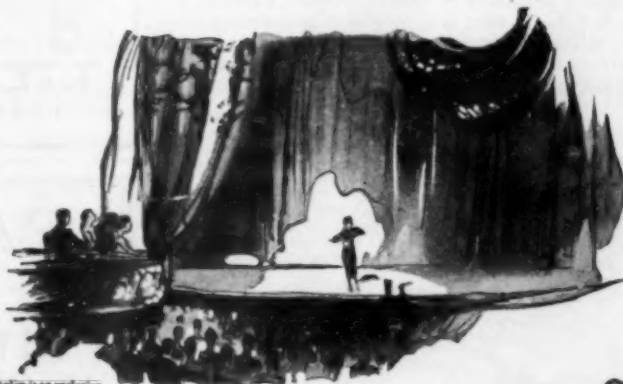
Bakelite is playing a vital part in this universal radio reception. It is used by over ninety-five per cent of the manufacturers of radio sets and parts, for they know that Bakelite insulation can always be depended upon to give superior results in service, in any climate and at any time of year.

Some of the many radio applications of Bakelite are shown in the adjoining column. When buying a radio set or part make sure it is Bakelite insulated, for this is a definite indication of quality.

Write for Booklet 27

BAKELITE CORPORATION

247 Park Avenue, New York, N. Y.
Chicago Office: 636 West 22d Street



Bakelite is an exclusive trade mark and can be used only on products made from materials manufactured by the Bakelite Corporation. It is the only material which may bear this famous mark of excellence.

BAKELITE

MADE FROM P. H. & C. PAT. 1,010, 1,011



BAKELITE is the registered trade mark for the phenolic resin product manufactured under patents owned by the Bakelite Corporation.

THE MATERIAL OF A THOUSAND USES

and
still
tight!

Abused—twisted—
bent back and forth
dozens of times—
yet every plate in
this Red Seal Con-
denser is still firmly
embedded in the
shaft—every one
still forms a perfect
electrical joint.



Red Seal Condensers make good sets better

IN one of the well-known laboratories in New York City there is a special condenser, designed for making electrical measurements. It is a precision instrument in which every precaution and every known device have been employed to secure maximum efficiency. Its electrical losses are so low that they are negligible and to all intents and purposes it is a perfect condenser.

Recently a Red Seal Condenser—right out of stock—was tested against this instrument in a measuring circuit. The difference between the losses of the two condensers was so low as to be practically immeasurable!

The cost of the laboratory condenser was probably \$150—the 23 plate Red Seal Condenser costs \$6! It, too, is a precision instrument for critical sets—but its price is easily within the reach of every radio enthusiast desirous of making a good set better.



Because of the difficulty in securing delicate adjustment you, probably, have oftentimes turned your condenser plates right through the sharp peak of an incoming signal wave. The friction Vernier of the Red Seal permits adjustment to a hair-line. It is the ideal control for this precision condenser.

Made in four sizes:

13 plate .00028 M.F. 23 plate .0006 M.F.
17 plate .00037 M.F. 43 plate .001 M.F.

MANHATTAN
ELECTRICAL SUPPLY CO., INC.
NEW YORK CHICAGO ST. LOUIS SAN FRANCISCO

MAKERS OF THE FAMOUS RED SEAL BATTERIES

The most distant stations are heard

With Myers Tubes you can get virtually every station on this continent and elsewhere. England, France, Cuba, Hawaii, Porto Rico, Japan are being heard daily with one, two or three Myers Tubes.

They are noise free—locate stations easily—clear reception—and are interchangeable. Each Myers Tube passes 49 separate and individual tests. Each is actually tested for reception.

Three types for dry and storage batteries. All ready to mount. At your dealer's or sent postpaid for.....

\$4

246 Craig Street, Montreal 10

Myers Tubes
Practically Unbreakable



Write for descriptive circular

TOAZ GRIPFAST TERMINALUGS

Patent Applied For
NOW READY FOR DELIVERY

**COPPER—TINNED—\$3.00 M
AMATEURS!**



60 Plain Type Lugs \$0.25
60 Gripfast Lugs .25
25 Doublelugs, (1 9-16 centers).25
12 feet Bus Wire .25

Any combination—5 items \$1 Pp.

Discounts to Dealers

Free Pamphlet Practical Soldering



TOAZ Engineering and Sales Co.

11703 Robertson Ave., Cleveland, Ohio

PATENTS

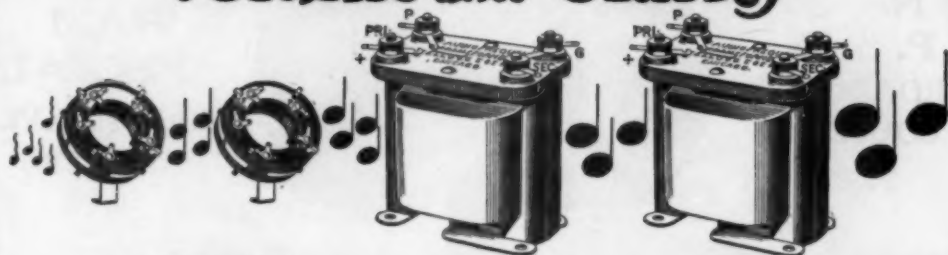
TRADE MARKS · DESIGNS
FOREIGN PATENTS

MUNN & Co.
PATENT ATTORNEYS

Associated since 1846 with the Scientific American
840 Woolworth Building, New York City
521 Scientific American Bldg., Washington, D.C.
410 Tower Building, Chicago, Ill.
363 Hobart Building, San Francisco, Cal.
218 Van Nuys Building, Los Angeles, Cal.

Books and Information on Patents and Trade Marks
by Request.

Volume *and* Clarity



with Kellogg Transformers



Radio
Frequency
Transformer

A Radio Frequency Transformer of the aperiodic type suitable for all sets with which tuned radio frequency is desired. Also used for one stage of radio frequency amplification ahead of regenerative sets to prevent re-radiation.

Consider these points of superiority:

No dope to hold windings in place.

Soldered connections.

Mounting bracket holds coil at correct angle.

Minimum rubber used in form.

Lowest possible loss, with greatest transfer of energy.

Works with any .0005 condenser.

Secondary arranged with suitable taps for biasing features.

This transformer makes the construction of a radio frequency set an easy matter, assuring best possible reception with widely varying types of circuits, including reflex.

Built and guaranteed by Kellogg Switchboard and Supply Co.

No. 602 Radio Frequency Transformer
at your dealers for \$2.35 each.

Kellogg Audio Frequency Transformers are the "stepping stones" of modern amplification.

Clear, accurate reproduction assured over the entire range of the musical scale.

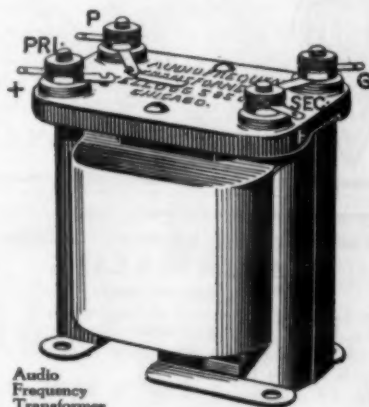
Plainly marked, accessible terminals.

It is acclaimed by test to be the best.

No. 501 Audio Frequency Transformer
Ratio $4\frac{1}{2}$ to 1—

No. 502 Audio Frequency Transformer
Ratio 3 to 1—

\$4.50 each

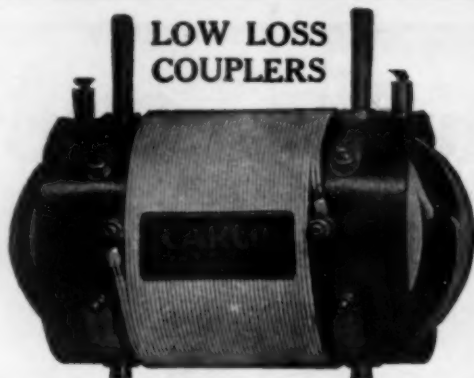


Audio
Frequency
Transformer

KELLOGG SWITCHBOARD & SUPPLY CO.

1066 WEST ADAMS STREET, CHICAGO

**175 to 600
METERS
No. 3
P. S. T.
BROADCAST
COUPLER
\$6.75**



**50 to 150
70 to 200
METERS
HAM
SPECIAL
SHORTWAVE
COUPLERS
\$6.00**

This original two rotor coupler, on market for three years.

With a wave trap tunes as sharp as a superhet. For selectivity far superior to a five tube set with two stages R.F.

This coupler consists of a single unit in which is contained a "low loss" Stator or secondary winding and two rotors, one of which is the antenna inductance and wound with "low loss" coarse wire.

The coupler is strongly recommended for use in congested districts where interference is bad.

At your dealers or sent C. O. D.

Send for "Carco" Catalog

DESIGNED BY A HAM FOR HAMS

Government specifications for short wave low loss tuner are No. 10 D.C.C. wire wound single layer.

The "CARCO" Ham Special using two No. 18 D.C.C. wires in parallel (equal to a No. 12) is the nearest approach to these specifications of any on the market. A compact unit in a space of only 3" x 5 1/4".

Antenna Rotor and secondary Stator designed for "Low Loss" and "Low Resistance."

Our special single layer, multiple wound inductance does the trick. Low loss tubing used.

THE CARTER MANUFACTURING CO.

1728 Colt Ave., East Cleveland, O., U. S. A.

A Real Man-Size Emblem! For League Members Only



We're glad to announce that you can now get a durable, weather-proof, brilliant A.R.R.L. Emblem. Just the thing for the inside or outside of your shack, for your mast, for decoration in Radio Club Rooms, at Conventions,—wherever A.R.R.L. men get together.

19 x 8 1/4", sheet steel base, heavily enameled in golden yellow and black, with holes top and bottom for hanging.

These emblems sure are FB, gang, and we'll send them anywhere postpaid for only \$1.25 apiece.

THE AMERICAN RADIO RELAY LEAGUE, HARTFORD, CONN.

Yes—our new Amateur Catalog the HAMALOG is ready at last

Some Leaders—see our Ham Ads for more
No. 12 solid copper enameled wire, 1000 ft. \$6.90. Less at 75c per 100 ft. Any length in one piece.

No. 14 enameled, 1000 ft. \$5.00. Less at 55c per 100 ft.

Ballantine's "Radio Telephony," the "amateur's bible," in stock at \$2.00

4001-1 S tubes \$10.00, sockets 90c. Order early, gang, they're scarce.

Include postage, please

E. F. JOHNSON

9 ALD

Waseca, Minn.

WIMCO Announces

Our experimental laboratory is developing instruments for short wave transmitting and receiving.

A real Wave Meter will be ready soon. We know that all hams will be interested.

Send us your name for our mailing list

The Wireless Mfg. Co.

Canton, Ohio



**JUST THE SET
FOR THE
LAYMAN**

The dyed-in-the-wool ham wouldn't think of buying a complete set. He prefers to build his own. But here—in this AMRAD Neutrodyne—is a real power plant he can recommend without hesitation to his layman friend.

5 Tubes delivering tremendous power, but only 2 Tuning Dials. Wonderful tone quality. High selectivity. A LICENSED Neutrodyne. Yet the price is reasonable.

Write for Folder 520 for complete details, if your dealer is not stocked with this latest AMRAD.

*A Genuine
Licensed 5-Tube
NEUTRODYNE
Only
\$85*

AMRAD NEUTRODYNE

"The Voice of the Air"

AMERICAN RADIO AND RESEARCH CORPORATION

Dept. Q



Medford Hillside, Mass.

The Panels That Produce Results

A superior panel will increase the efficiency of your reception through reducing surface leakage. You can be certain of this if your set is built with

ELECTRASOTE TRADE MARK PANELS



These beautifully finished panels will neither warp nor change color. They are scientifically constructed to reduce surface leakage to a minimum, hence assure increased efficiency of the set.

One of the famous "sote" products introduced by The Pantasote Company, Inc., Electrasote Radio Panels are sold strictly on their merits—yet are

Lower Priced than other standard panels

Make your Set an "Electrasote Panel Set"—and get results!

On Sale at good Radio Dealers

M. M. FLERON & SON, Inc.

Sole Sales Agents

Trenton, New Jersey



Is it distance that you want in a radio? A Crosley will get it—the smaller models with earphones, the three tube 53 and Trirdyn on a loud speaker.

Do you desire ease of tuning? You have it with a Crosley. It is child's play to locate new stations. After they are logged, you can immediately bring them in.

Do you wish economy of operation? Because they use the famous Armstrong Regenerative principle, Crosley Radios require fewer tubes. Because of the fewer tubes, they consume less battery current. Is price a factor with you? Crosley Radios, each in its class, are the least expensive ever offered. Quantity production allows these low prices without lessening in any way the very great efficiency of the sets.

No Matter What Appeals to You Most in Radio, You Will Find That Point Outstanding in a Crosley.

Trirdyn Regular

Now \$50

Before You BUY—COMPARE.

Your choice will be a Crosley For Sale by Good Dealers Everywhere

Crosley Regenerative Receivers are licensed under, Armstrong U. S. Patent 1,113,149. Prices West of Rockies add 10%

Write for Complete Catalog

The Crosley Radio Corporation

Paul Crosley, Jr., President

318 Sassafras St. Cincinnati, Ohio. Crosley owns and operates Broadcasting Station WLW



PATENTS Secured

Radio Inventions a Specialty

Trade Marks Registered

Mason, Fenwick & Lawrence

Patent and Trade Mark Lawyers

Washington, D. C., New York, Chicago

Established over 60 years

Write us

References: National Confectioners' Association, Chicago; National Cannery Association, Washington, D. C.; Life Savers, Inc., Port Chester, N. Y.; Bon Ami Co., U. S. Cigar Co., New York City; Hershey Chocolate Co., Hershey, Pa.; Stephen F. Whitman & Son, Philadelphia, Pa., and many others.

Best for Reflex

and Crystal Sets

FRESHMAN

Double Adjustable
Crystal Detector



No more searching for the sensitive spot. Merely turn the knob as you would a dial. For base or panel mounting com. \$1.50. Also with Freshman Super-Crystal. At your dealer's, otherwise send purchase price and you will be supplied postpaid. CHAS. FRESHMAN CO. Inc., Freshman Bldg. 240-248 W 40 St., New York

DE FOREST
Leads again

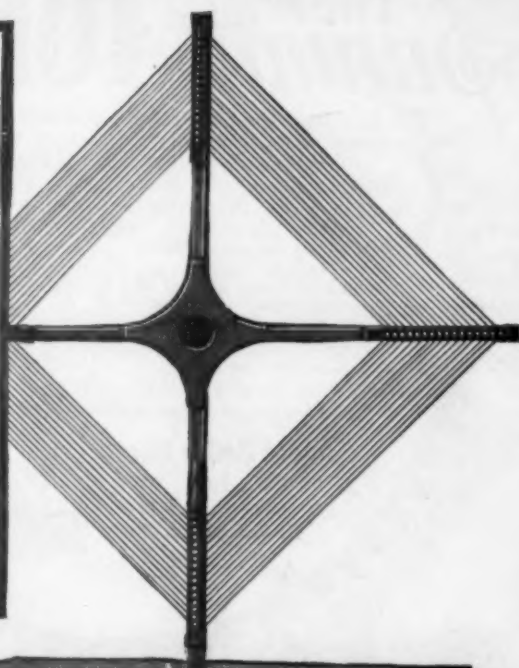
Another jump ahead!
Just out—First in 1925

DE FOREST'S greatest triumph. A truly remarkable advance in ease of operation—beauty of tone—selectivity—distance range. It uses tube detector instead of crystal.

You should see and test this instrument before you buy any set. Its refinements and improvements are too many to tell here.

Ask your nearest De Forest dealer to bring it to your home and show you how simply and perfectly it operates. It will be hard for you to let him take it away.

Price range, \$125 to \$200



THE NEW
DE FOREST D-17

REG. U.S. PAT. OFF.

De Forest Radio Company, Jersey City, N. J.

THE *Summit* TOROIDAL

used in exactly the same manner as the open radio frequency coils—they are self balanced and self neutralized. They have no stray fields nor leakages, nor can they feed back, thus assuring the radio set builder of correct operation without howling or squealing.

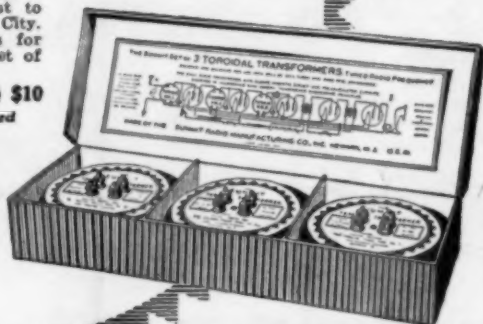
One builder using these Transformers in the SUMMIT circuit received 54 stations in two nights travelling West to Denver and South to Mexico City. This circuit with instructions for building enclosed with each set of Transformers.

List Price (Set of 3 mated Units) \$10

Distributors and Jobbers Wanted

**Summit Radio Mfg.
Co., Inc.**

481 Broad Street, Dept. 41
Newark, N. J.



Pat. Applied for.

Minnesota Man Claims 2-Tube Reception Record with Lopez Low-Loss Tuner



"Edward C. Connelly of Breckenridge, Minn. claims the greatest reception record in the Northwest during International Radio week with a two-tube set. His reception record is as follows: Madrid, Aberdeen, Birmingham, Lyons, Newcastle, Rome and stations in Porto Rico and Mexico City. Mr. Connelly assembled the set himself."

—Reprint from Minneapolis Tribune

As he used dry coil tubes, which give about 75% of the signal strength secured with 6 volt tubes, he attributes his record to the

LOPEZ LOW-LOSS TUNER

Exceptionally well made No short-circuited turns
Rigid inspection Rugged
Minimum insulation Super Selectivity

Broadcast Type, 200 to 600 meters
Regular Amateur, 40 to 205 meters

Circuit diagram, panel drilling tem-

plate and instructions with each tuner

PRICE \$10 each At your dealers or sent direct, postpaid

A. C. LOPEZ & CO.

334 Fifth Avenue Dept. P-3 New York City

use
RESISTANCE!

DURHAM

Grid Leaks

75¢

Variables—
No. 101—1-10 to 5 meg.—soft tubes.
No. 201A—2 to 10 meg.—hard tubes.
No. 100—1000 to 100,000 ohms by-pass.

Metalized Fixed—
Over 10 meg. 200 ohms, 75¢.

DURHAM & CO., Inc. 1936 Market Street, Philadelphia

at dealers
or postpaid

RADIO TUBE EXCHANGE

We Repair All Standard Makes of Tubes, Including

W.D. 11 or 12
U.V. 199 or C299
U.V. 201A or C301A
C. 11 or 12
D.V. 1 or D.V. 2
U.V. 200 or 201
C 300 or 301

\$1.50



U.V. 202 Repaired. \$3.00.

All tubes guaranteed to do the work.

RADIO TUBE EXCHANGE, 200 Broadway, New York

All Mail Orders Given Prompt Attention

Orders Sent Parcel Post C. O. D.

National Electric

Less QRM
More DX
No More
"Break-Down"

TRANSMISSION CONDENSERS For Radio Filter Circuits



No. 1, 1,000 V. DC Service, per
2.5 mfd. condenser . . . \$7.00
No. 2, 2,000 V. DC Service per
2. mfd. condenser . . . \$8.00

Order direct by letter or use the coupon.

Are you tired of "break-downs"? Here is a special, high-dielectric, low-loss condenser that will end your troubles. Under test at double their rated voltage, their phase angle does not exceed 20 minutes—which means a loss of not over $\frac{1}{2}$ of 1%—or an efficiency so close to 100% as to be negligible. With National Electric Condensers you send out less QRM and gain the good will of every BCL around you. And you get more DX because a properly designed filter circuit gives a clearer, more understandable note.

National Electric
Condenser
Company
New Haven
Conn.

COUPON

**National
Electric**

Condenser Co.

New Haven, Conn.,

Gentlemen: Ship
C. O. D. the fol-
lowing:

.....No. 1 Condens-
ers at \$7 each.
.....No. 2 Condensers
at \$8 each.

Write your name and address plainly in space above.

Imported Insulators from Germany



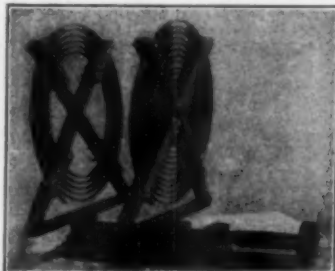
Germany has been famous for the production of high-grade porcelain. These insulators are pure white glazed 5 inches long.

25c Each

Sent Parcel Post upon receipt of price.
Sole American Distributor

Tobe C. Deutschmann

46C Cornhill-Boston, Mass.



MANUFACTURED BY

J. GROSS & CO.

Phone 323 E 83 Street
Lenox 10199 New York City, N.Y.

Coupled Inductances \$10⁷⁵

Rugged
construction
fine screw
adjustment
Very heavy
ribbon.
Just the thing
for short
waves.

R.F. choke
Coils \$1.50
Postpaid.
Include extra
postage for
Inductance.

NOW -its the "SELF ADJUSTING" RHEOSTAT



No more guessing and uncertainty as to your tube filament voltage. AMPERITE inside your set, one for each tube, automatically gives just the right current to bring the most out of every tube. Simplifies wiring and operation. Increases set compactness. Lengthens tube life. Tested, proved and adopted by more than 50 set manufacturers. The set you buy or build will not be up-to-the-minute in effectiveness without it.

\$1.10 Everywhere

RADIALL COMPANY

Dept. QST-3 50 Franklin Street, New York

Write for
FREE
Hook-ups



AMPERITE
REG. U.S. PAT. OFF.
"means right amperes"

ALWAYS MENTION Q S T WHEN WRITING TO ADVERTISERS



RMA



Radio Music for the Critical

Music lovers—especially delight in Rauland-Lyric. Used in all audio amplifying stages of a radio receiver, it reproduces with fidelity those elusive refinements of tone quality which, to the trained ear, mean artistic excellence.

Rauland-Lyric is a laboratory grade audio transformer designed especially for music lovers. The price is nine dollars. Descriptive circular with simplification curve will be mailed on request. All-American Radio Corporation, 2642 Coyne St., Chicago.

Rauland-Lyric
AN
ALL-AMERICAN
TRADE MARK
TRANSFORMER

The Choice of Noted Music Critics



NOW \$3.50 C.O.D.
Direct from factory to you

THE RABAT SENIOR
4700 MIL. AMPS. CAPACITY

FOR A LIMITED TIME ONLY

You can purchase for \$3.50 a 12 cell 24 volt RABAT SENIOR battery. Saving \$6.10 through direct buying. The Jobber and Dealers profit now in years. 24 cell 48 volt also \$7.90.

Rabat Senior Batteries

are neat, powerful, new and well harmonized with any Radio Set. Separate cells and patented rubber cork prevent current leakage and clear glass tubes give vision of the condition of battery. Heavy duty plates 3-16" x 1" x 2 1/2" with staggered ribbed grid form the backbone of this sturdy battery. Shipped completely charged ready for instant use. And you can save \$6.10 by ordering now.

RABAT JUNIOR BATTERY \$2.15 c. o. d.

(12 CELLS 24 VOLTS 1200 M. A. CAPACITY)

Incomparable in price and performance. Designed to satisfactorily operate sets equipped with 3 tubes or less. Constructed of the same high grade materials as used in our Senior battery. Shipped dry, uncharged. Order today and save \$1.81.

Rabat batteries can be recharged at home at a very low cost.

Rabat Super-Charger \$3.00 c. o. d.

Is specially designed to satisfactorily recharge any make of storage "B" battery. Shipped complete ready to use, including lamp socket, attachment plug and cord. You save \$1.80 by ordering direct.

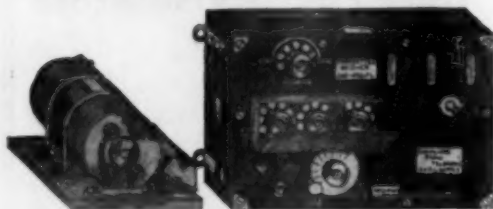
SEND NO MONEY

But write us today, advising quantity and type wanted. After examining and approving these wonderful batteries then pay the Expressman the small C.O.D. charges.

The Rabat guarantee is back of all our products. DON'T WAIT. ORDER TODAY and save the middleman's profit.

THE RADIO RABAT COMPANY
1780 St. Clair Avenue, Cleveland, Ohio

NAVY SEAPLANE TELEPHONE Transmitter and Receiver Complete



(WITHOUT TUBES OR BATTERIES)

200—600 Meters Consists of Transmitter and Receiver Cabinet, 12v to 150v Dynamotor, Microphone, Headset.

Price \$60 (new ones), \$55 (used ones). Express Paid.
GEORGE W. EATON ELECTRIC CO., 1915 512, Phila., Pa.

MERSON Electrolytic Condenser 36 Mfd.

\$6.95

GREAT NORTHERN

60 Vesey Street

New York City



METER TESTED RADIO CRYSTALS

Full, clear certification insured by newly developed reliable laboratory meter-testing. Perfect for resale. Price 60c at your dealer or direct.

Newman-Stern

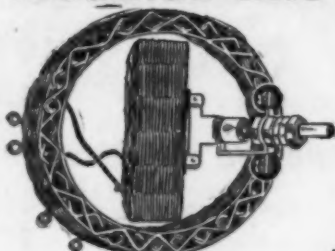
1750 East 12th Street

Cleveland, Ohio



Learn What Low Loss Means!

The Only Tuner That Can Be Mounted Into Any Previously Wired Set Without Changes



—or can be substituted for the coupler you are now using. These Lorenz System basket weave Radio Low-Loss Tuners are the most efficient yet devised.

Type A - Single or Double Circuit	\$6.00
Type B - Three Circuit	6.00
Type C - Radio Frequency Units	2.25

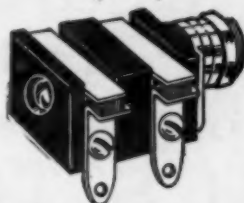
"Radjo" Anti-Capacity Jacks and Switches

A new departure in radio apparatus. Designed for radio circuits exclusively with advantageous features possessed by no other jack on the market. Their infinite low capacity merits their use. Wiping contact is of extremely large area under a maximum tension. Radjo jacks are small and compact, requiring very little space.

The Line Consists of Five Jacks and Three Switches. Write today for interesting literature giving complete information regarding Radio Low-Loss Products.

THE SHARP SPARK PLUG CO., Wellington, Ohio

"Sharp" Products—Licensed Mfrs. **JOBBERS, DISTRIBUTORS—Write for our Proposition**



The Sharp Radjo LOW LOSS TUNER



The 100% Self-Shielded Transformer

has made a big hit with both set makers and set manufacturers because of its small size, its amazing volume and most of all, because of its pure undistorted tone. It is half the size of other transformers, but its results are unsurpassed. Absolutely new and scientific design and construction. Ratios 1 to 3, 1 to 4, 1 to 5 \$3.50. Ratio 1 to 10 \$4.50.

SEND FOR BULLETIN No. 94. Read all the exclusive features of this and other Premier Parts. Tells how to get free hook up diagrams beautifully printed in two colors.

PREMIER ELECTRIC COMPANY
3811 Ravenswood Avenue CHICAGO

PREMIER Quality Radio Parts



JEWELL Radio Test Set No. 95

† This is our most distinct contribution to Radio. Very valuable for testing tubes.

† May we send you a copy of our Radio Test Set Circular No. 14-C

Order from Dealer

JEWELL ELECTRICAL INSTRUMENT CO.
1650 Walnut St. - Chicago

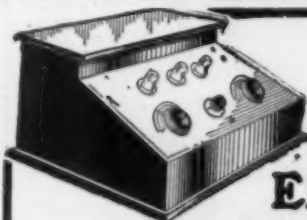
RADIO ENCYCLOPEDIA



FREE! Thousands of radio bargains, standard parts, standard parts for sets, vacuum tubes, etc., at one-third less than regular prices, also latest information on all circuits, complete list of broadcasting stations and other valuable data. Send name and address, we'll send you 50c worth **FREE!** **FREE SERVICE DEPARTMENT.** We Doctor at N Y. How World will help you solve your radio problems and furnish up-to-date information on latest construction, equipment, repairs, etc. This service **FREE** to our customers. Write today!

NORWALK RADIO CORP.
Dept. 58 C. 66 READE ST., NEW YORK

ALWAYS MENTION Q S T WHEN WRITING TO ADVERTISERS



The

EAGLET

3 Tube Dry Cell

NEUTRODYNE

\$75

The World's
Greatest Popular
Priced Set

Manufactured and Guaranteed by

EAGLE RADIO COMPANY

Makers of

The Famous Models A and B

EAGLE NEUTRODYNE RECEIVERS



Your protection for
quality and unparalleled

VALUE

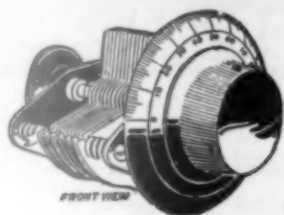
Ask the Dealer—He Knows

EAGLE RADIO COMPANY

23 Boyden Place

Newark, N. J.





Q-U-A-L-I-T-Y

**Based On
Perfection
of Parts — in
U. S. TOOL
CONDENSERS**

A condenser is no more efficient than its weakest feature—a thought borne constantly in mind in designing and making U. S. Tool Condensers. As a result, the gradual perfecting of each part has lead to the nearest point approaching condenser perfection. Ask your dealer to show you Type 6, with the micrometer dial.

**FACTORY
GUARANTEE**

**Write for
Literature**

**U. S. TOOL
COMPANY, INC.**

112 Mechanic St., Newark, N. J.

*Mfrs. of Special Tools, Dies, Jigs,
Automatic Machinery and Sub Presses*

BESTONE RADIO TUBES

FOR

QUALITY, VOLUME and DISTANCE

200 199
201A \$1.50 12

STANDARD 199 BASE

Save Money, buy direct. Every Tube is guaranteed. Mail orders and C. O. D.

Discount to dealers.

All orders filled same day as received.

BRYANT RADIO TUBE COMPANY

453 Washington Street, Boston, Mass.

Radio Inventors!

If you have a marketable idea, we have the necessary plant and facilities. Either royalty or outright purchase. Write us at once.

Box Z, % Q. S. T., Hartford, Conn.

**Have a BALLOON AERIAL For
Week-end Try-outs, Etc.**

Reception considerably greater than regular horizontal. Vertical aerial is "low loss" and not so noisy. Write for literature.

Price with all necessary equipment, \$5.00 plus postage. Shpg. wght., 4 lbs. Includes instructions; 300 ft. of special aluminum antenna wire; large reel; stoppies and tubing for making gas in a jug; calcium chloride drying tube with an extra 1/4 lb. for renewals; balloon patches and three 30 inch pure rubber balloons.

**E. P. SCANLON, Radio Specialist,
Lakewood, Rhode Island**

SUPER-INSULATED WIRE CO.

115 Sandwich Street, Plymouth, Mass.

Manufacturers of Fine Magnet Wires, Resistance Wires, Radio and Litz Wires.

Enamel, Cotton and Silk Insulations. Special combinations of Litz Wires made up on request, also other wires, according to specifications.

Prompt Deliveries

HAM-ADS

Six cents per word per insertion in advance
Name and address must be counted. Each
initial counts as one word. Copy must be
received by the 1st of month for succeed-
ing month's issue.

YOUR RADIO—WHAT IS IT? SIMPLY A FORM OF AMUSEMENT? OR THE FULFILLMENT OF THAT AMBITION TO EXCEL? IF YOU DEMAND THE BEST NO RECTIFIER PLATE SUPPLY WILL SATISFY YOU—NOTHING BUT AN EDISON B—THE 8ML KIND. PRICED FOR RESULTS, NOT JUST TO SELL. GET ONE OF THESE. 54 VOLTS (A KICK-STARTER FOR THAT LOLOSS SET) \$8.75. 100 VOLTS (JUST RIGHT SIZE) \$16.00. 130 VOLTS \$20.00. 150 VOLTS \$23.00. COVERED CABINET WAX FINISHED, RUBBER MAT, LARGEST EDISON ELEMENTS CAREFULLY WIRED WITH PURE SOLID NICKEL, GENUINE EDISON ELECTROLYTE (THAT'S NO LYE). PACKED TO REACH YOU SAFELY. SINGLE CELLS 16c. HERE'S A 5 TON TRUCK THAT'LL PULL THAT BIG SET OF YOURS—A 2000 MILIAMP HOUR DOUBLE CAPACITY B IN HEAVY FLAT BOTTOMED GLASS JARS. 105 VOLTS \$25.00 OTHER VOLTAGES. STATE UNIVERSITY HAS 800 CELLS. SINGLE CELLS 19c PARTS. 21c READY TO WIRE. 26c WIRED. DISCOUNTS 500 VOLTS UP. YOUR EDISON B WILL WORK—IF MADE FROM 8ML SURE-FIRE PARTS. LARGEST LIVE TYPE A EDISON ELEMENTS 6c. DRILLED 7c. WIRED WITH PURE SOLID NICKEL 10c PAIR. G ELEMENTS 4c PAIR. 2 POSITIVES, 1 NEGATIVE 5c. HICAP G CELLS 1500 MILIAMP HOUR 17c PARTS. 19c. READY TO WIRE. 24c WIRED. INCLUDES EDISON SOLUTION. BOTH G AND A HICAP CELLS GREAT FOR SUPERS, POWER AMPLIFIERS, TRANSMITTERS. FOR THE SUPERHET AND HIPOWER TRANSMITTER A STILL HUSKIER CELL—SUPERCCELL—3000 MILIAMP HOUR CAPACITY. 30c CELL PARTS. 40c WIRED. ANNEALED GLASS TEST TUBES INDIVIDUALLY WRAPPED 3/4 x 6" 3c. 1 x 6" 4c. SHOCK PROOF 1 x 6" FLAT-BOTTOMED HEAVY GLASS JARS 1/4" THICK 4c. 1 1/4 x 6 1/2" 5c. LIFE INSURANCE POLICY FOR YOUR B. WIRE WITH .032 PURE SOFT SOLID (NOT PLATED OR ALLOY) NICKEL WIRE 1 1/2c FT. PREPAID PERFORATED HARD RUBBER SEPARATORS. WORK YOUR EDISON ELEMENTS TO FULL CAPACITY. ONLY POSSIBLE WITH CHEMICALLY CORRECT COMBINATION OF LITHIUM AND POTASSIUM—EDISON ELECTROLYTE. \$1.50 PREPAID TO MAKE 5 lbs. SOLUTION. CAN'T RUN THE OLD BUS WITHOUT GAS—NOR THE B EITHER. REALLY CHARGE IT WITH A WILLARD COLLOID RECTIFIER. SMALL 50 VOLT SIZE \$2. JUMBO \$3. 100 VOLT FULL WAVE COLLOID. SMALL \$4. LARGE FOR HICAP CELLS \$6. CHARGES 100 VOLTS ALL IN ONE BITE. USES BOTH HALVES OF CYCLE. HIVOOLTAGE TUNGAR CHARGER INSTRUCTIONS 50c. EVERYTHING FOR THAT EDISON B. FRANK MURPHY—RADIO 8ML. 4837 ROCKWOOD ROAD, CLEVELAND, O.

WHY SUBSCRIBE FOR QST? FOR STATION EFFICIENCY, SURE, READ QST. THEN GET IT FROM 8ML. DON'T CHOKE THOSE SIGNALS WITH A GRIMY AERIAL. NO. 12 SOLID COPPER ENAMELED FOR A CLEAN GET-AWAY AND AN INVITATION TO THE PASSING WAVE. 1c FT. PREPAID 3rd ZONE. \$7.50 1000 FT. FOR THE TOPNOTCH STATION—OHIO BRASS INSULATORS. CAN'T MATCH 'EM 5" 75c. 10" \$1.50 PREPAID. FLUX-DISTRIBUTING SHIELDS \$1 ATTACHED. NEXT BEST PORCELAINS. WET PROCESS BROWN GLAZED X INSULATORS 5" 75c PAIR. \$2.50 FOR 10. 9" \$1 PAIR. \$4 for 10. REAL GUY EGGS \$2 for 25. LO-CAPACITY. LOLOSS TUNER WIRE NO. 12 \$1.25 100 FT. NO. 16 60c 100 FT. PREPAID. A REAL HAM-BUILT TUNER 50-150 METERS \$5 AIR CORE. 7 PLATE LOLOSS STRAIGHT LINE CONDENSER \$4.25 WITH HOOKUP. L AND U SHAPED LAMINATIONS FOR THAT TRANSFORMER AND CHOKE 20c lb. SILICON STEEL. A REAL LEAD-IN OF PYREX GLASS WITH METAL CLAMPING RING. \$3.75. NOW GO TO IT OM. AND BUILD THAT HE-STATION—GET IT FROM 8ML. FRANK MURPHY, 4837 ROCKWOOD ROAD, CLEVELAND, O.

ALWAYS MENTION Q S T WHEN WRITING TO ADVERTISERS

TALK TO ONE OF OUR THOROUGHLY SATISFIED CUSTOMERS, THERE'S THOUSANDS OF THEM. IN CHANGING FROM FIVERS TO FIFTIES THERE'LL BE NEW PARTS TO INSTALL. WE HAVE THOSE PARTS, SUCH AS, RCA FIFTY WATT SOCKETS \$2.50. LARGE GRID LEAKS, \$1.65. ONE MFD 1750 VOLT TEST FILTER CONDENSERS \$2.50. RCA 3000 VOLT .002 PLATE AND GRID CONDENSERS \$2.50. ACME PLATE, POWER, AND FILAMENT TRANSFORMERS WITH SEVERAL MODELS OF EACH TO CHOOSE FROM. SUGGEST YOU WRITE US YOUR NEEDS, WILL BE ABLE TO FILL YOUR ORDER. JUST ARRIVED, MILES AND MILES OF NO. 12 SOLID COPPER ENAMEL ANTENNA WIRE. THIS IS THE ONLY WIRE THAT STAYS CLEAN AFTER ITS PUT IN THE AIR. WE HANDLE ONLY HIGHEST QUALITY, GIVE FULL MEASURE, AND IT IS GUARANTEED TO BE NO. 12. BEWARE OF "JUST AS GOOD" AT A CHEAPER PRICE. THE COUNT IS SHORT, AND THE SIZE IS SMALLER. GET INTO THE GAME, AND PUT UP SOME URSELF, THE PRICE IS ONLY \$1.00 PER HUNDRED, AND WE PAY POSTAGE TO THE THIRD ZONE. POSITIVELY GUARANTEE SHIPMENT, IMMEDIATELY IN ONE PIECE, OF 100 TO 6500 FEET. AND WHEN ORDERING, DON'T FAIL TO INCLUDE ENUFF OHIO BRASS INSULATORS TO MAKE IT ANTENNA LEAK-PROOF. THE FIVE INCH IS 75c AND THE TEN INCH IS \$1.50. THIS IS AN UNBEATABLE COMBINATION. SEEN ANY OF THOSE NEW RCA UV208-A TUBES YET? THEY'LL MAKE UR EYES BUG OUT. LARGE PLATES AND GRIDS, WELL ANCHORED, FILAMENT ONLY PULLS 3.25 AMPS AT TEN VOLTS. PLENTY OF THEM IN STOCK, PRICE \$38.00 FOB FT. WORTH. WE ARE PULLING FOR UR BUSINESS OM'S AND YOU ARE EARNESTLY REQUESTED TO GET IN TOUCH WITH US, WHENEVER IN NEED OF TRANSMITTING PARTS. WE'RE THE ONLY HAM STORE IN THE FIFTH DISTRICT. ADDRESS UR LETTERS OR CARDS TO THE FORT WORTH RADIO SUPPLY CO; 104 EAST 10TH ST., FORT WORTH, TEXAS.

\$175.00 Western Electric 14-A Cabinet type power amplifier. New, in original carton. Includes 3-216 A tubes. A few left at \$80.00, F.O.B. Cleveland. The Carter Mfg. Co., East Cleveland, Ohio.

YOU AMBITIOUS HAMS who want to make some jack on the side selling sets and supplies to your friends, write me for discounts. All standard lines. Edward Bromley, Jr., Whitewater, Wis.

EDISON B BATTERY SUPPLIES. LARGEST SIZE TYPE A ELEMENTS 4c A PAIR. DRILLED 5c A PAIR. WIRED IN PAIRS 8c. PURE NICKEL WIRE 1c A FOOT. PERFORATED RUBBER SEPARATORS FOR CELLS 1/3c EACH. PERFORATED RUBBER SHEETS 5/8 x 53/16 3c EACH. CHEMICALS FOR 5 LBS. OR 100 VOLTS OF BATTERY SOLUTION 75c. ALL ARTICLES POSTPAID. SEND REMITTANCE WITH ORDER. BERNARD T. STOTT, 60 PALLISTER AVE., DETROIT, MICH.

REAL BARGAINS 100 volt Todd Edison B Battery 12.50, 140 volt Kimley 16.00. Both have front panels. UV1714 RF Transformers \$3.00. UV1716 for superhet \$5.00. R3 Magnavox \$17.50. Shipped COD. Van Blaricom, Helena, Mont.

We bought \$10,000. worth United States Government Aircraft Department Radio Transmitting Receiving Sets and Parts; get our new and latest reduced price list. Send Stamp 2c for list. Mail Orders answered all over the world. WEIL'S CURIOSITY SHOP, 20 S. 2nd St., Philadelphia, Pa.

Motor Generator Bargains. Robbins & Myers Motor 110 Volt 60 cycles single phase Generator 750 Volt 400 Watt \$60.00 Robbins & Myers Motor 110 Volt 60 cycles single phase generator 500 Volts 200 Watts \$45.00. G. E. Motor 220 Volt 60 cycles 3 phase 1750 R.P.M. Generator 400 Volts 150 Watts \$35.00. Esco Motor 220 Volt Direct Current Generator 500 Volt 200 Watts, \$35.00. Esco Motor 220 Volt 60 cycles single phase A.C. Generator 500 Volt 200 Watts \$40.00. 1000 V. 400 Watt 1750 R.P.M. Generator only \$60.00. Esco B. Battery charging motor generator sets, generator 175 Volts Direct current 1 1/2 Amp. motor and Alternating current \$37.50 each. 750 Volt 200 Watt 3400 R.P.M. Generator only \$30.00. All above machines are ring oiled and prices include field rheostat. Queen City Electric Co., 1734 W. Grand Ave., Chicago, Ill.

LOOK—Ambassador type couplers \$3.50; three tube Ambassador type receiving sets \$30.00; audio transformers ratio 5-1 \$4.00 each; dealers and agents write for lists and discounts. **THE VANDA Co.**, 46 Thomas St., Newark, N. J.

RADIO GENERATORS—500 volt 100 watt, \$28.50 Battery Charging Generators \$8.50. High Speed Motors, Motor Generator Sets, all sizes. Motor Specialties Co., Crafton, Penna.

ENVELOPES—100 good white envelopes with name and address printed, 50c postpaid. Emblem or call in red f .25 extra. Guy Sherman, Clinton, Ia.

TELEGRAPHY—Morse and Wireless—taught at home in half usual time and at trifling cost. Omnigraph Automatic Transmitter will send, on Sounder or Buzzer, unlimited messages, any speed, just as expert operator would. Adopted by U. S. Govt. and used by leading Universities, Colleges, Technical and Telegraph Schools throughout U. S. Catalog free. Omnigraph Mfg. Co., 16M Hudson St., New York.

159 GENUINE Foreign Stamps. Mexico War Issues, Venezuela, Salvador and India Service Guatemala, China, etc., only 5c. Finest approval sheet 50 to 60c. Agents wanted. Big 72p. Lista Free. We Buy Stamps. Established 20 years. Husman Stamps Co., Dept. 151, St. Louis, Mo.

200-20,000 METER receiver, including radiotron \$25.00; two step amplifier \$18.00. Smith, 4416 Market, Philadelphia, Pa.

STORAGE "B" batteries at dry cell prices. Purchase a rechargeable "HAWLEY" storage "B" battery. Non-sulphating or buckling of plates, which means clearer enjoyable reception with unlimited life. Sold in complete knock-down units which requires no former experience to put together. These units contain everything for the actual construction of battery such as large size tested Edison elements, special molded flat bottom glass cells (not ordinary test tubes), punched insulating fibre board for support of cells, pure annealed solid nickel wire Rubber stoppers, perforated hard rubber separators, full strength chemical electrolyte. With all orders there is included free an 8 page illustrated folder showing simple putting together making of charger and charging. Prices of units as above—22 volt \$2.95; 45 volt \$5.75; 90 volt \$8.95; 100 volt \$9.95; 120 volt \$11.50; 125 volt \$12.75; 150 volt \$13.90; 200 volt \$17.50. Special voltage units put up at no increase in price. Complete sample cell, 35c prepaid. Complete non-heating "B" battery charger \$2.75. Extra special 100 volt whitewood cabinet at \$2.75 only. Also "A" batteries at attractive prices. Order direct or write for my literature, 30 days' trial offer and guarantee. Orders shipped same day received. No waiting. B. Q. Smith, 31 Washington Ave., Danbury, Conn.

RADIOLA V detector and 2 stages—audio and crystal detector like new list complete \$142.50; sell for \$55.00; less tubes and batteries; but with 3000 ohm Frost Phone. \$5.00 deposit with express agent, balance C.O.D. subject examination. Geo. Schuks, Calumet, Mich.

NAVY TUNER FOR SALE TYPE IP-500 SAME AS SE-121 RANGE 300 to 6000, EXCELLENT CONDITION. COST \$595. WILL SACRIFICE FOR FIRST MONEY ORDER \$165. I. H. GRAHAM, 9 A.E.G. EL DORADO, KANSAS.

WAVEMETERS—designed, built and calibrated. Morse Engineering and Research Laboratories, Grantwood, N. J.

OMNIGRAPH with 15 dials, \$10. Grebe 13, \$50. Both guaranteed to be as good as new. J. W. McManigal, Horton, Kansas.

CR8, 2-step to match with UV-200 and 201A's and B batteries. Not a scratch on them. Costs \$120, sell \$60. Magnavox M-4 \$18. SCGL.

"Pyrex Insulators, Pyrex Sockets, Brandes Headsets, Bruno Condensers, Acme Transformers, Ever Ready Batteries, Wholesale and Retail. Chas. Leonard Hdwe. Co., Petersburg, Virginia."

FOR SALE—Paragon RA-10 Receiver and DA-2 Amplifier, \$75.00. C. E. Seabold, 341 W. DeWald St., Fort Wayne, Ind.

MAKE YOUR NEUT REACH OUT—Same panel, same layout, fewer parts. Our \$5.00 Kit includes the one different part, 22 feet real gold sheathed wire, lithographed print of Kladag Coast to Coast circuit, and complete, simple instructions. Nothing else to buy. Give selectivity with deep, resonant volume. NOT obtainable elsewhere. We originated this and can name scores of buyers it has delighted. Satisfaction guaranteed. Details 10c. Kit prepaid anywhere \$5.00. New 48 page catalog, thousands of items, many exclusive, for stamp. We accept postage stamps same as cash. **KLADAG RADIO LABORATORIES**, Kent, O

HI Mr. Fan! DON'T LET THIS REAL BUY GET BY—Brand New UV-202 Radiotrons (5 watt tubes) regular price \$8.00; MY PRICE \$6.00; only post office or express **MONEY ORDERS** accepted. SFE, Box 331, Egbertsville, N. Y.

What are we offered for the following material: all in first class condition: 1 De Forest Midget Radiophone Q73; 1 Model A Type MT4 Magnavox Tone Arm; 1 Thordarson Type R 1/4 KVA Transformer; 1 Thordarson Type R 1/4 KVA Transformer; 1 Murdock Oscillation Transformer. No reasonable offers refused. **M. M. Fleron & Son, Inc.**, Trenton, N. J.

RADIO Join our Sales organization and make big money. We want a man in every county to sell well advertised sets and parts made by the leading manufacturers. Widener of Kansas City makes \$150.00 weekly. You can do as well or better. Write today for catalogue and discounts. Name your county. Waveland Radio Company, Division 46, 1027 No. State St., Chicago, Ill.

Two transmitters with Receiving Outfits complete. Will sell at sacrifice price. On demonstration. Central Radio Co., 193 Centre St., New York.

ESPERANTO! Learn Esperanto and communicate with Radio Fans all over the world. Our free sample lesson contains over hundred illustrations and demonstrates how easily this language can be learned. Send for it now. Benson School of Esperanto, Inc., 20 Mercer St., Newark, N. J.

"Low loss self balancing radio frequency coils \$.75 each; 100 volt used Edison element welded B. battery cells, wax moulded in wood box with Fahnestock connectors \$15.00 each. Robt. Van Benthuyssen Co., Inc., 178 Centre St., New York City.

"**RADIO CALL PINS**" u9FZ. Your Station Call in **SOLID GOLD LETTERS** on tiny 50 watt tubes! \$2.50 p. p. Write R. C. Ballard, 1522 W. Sunnyside Ave., Chicago.

ARRIVED TOO LATE for Christmas—50% discount from list prices! Grebe CR-3, 5, 7, 9, 12, 13, 14 RORD RORN. All absolutely new in sealed original cartons. Reference QST. Cash only, shipped prepaid. Address Mr. Larry Healey, 518 Continental Ave., Detroit, Mich.

SAVE 20% on Everything from List Price. On all Standard Radio Merchandise. No exception. Every type and manufacture, from complete sets to parts, tubes and loud speakers; including Atwater Kent, Cunningham, Radio Corporation, Fada, Western Electric, etc.; mail orders promptly filled; 10% deposit with each order. On orders over \$25.00, 25% deposit is required. You pay us only after deducting 20% off list price. Economy Radio Sales Co., P. O. Box 90, Station O, Department 25, New York, N. Y.

RECEIVING AND TRANSMITTING ACCESSORIES. WHAT DO YOU NEED? I HAVE IT OR CAN GET FOR YOU QUICK. PYREX SOCKETS \$1.40 AND PYREX ANTENNA INSULATORS \$1.50. WRITE FOR COMPLETE LIST. ALL SHIPMENTS C.O.D. ORDER FROM THE SIXTH DISTRICT HAM AND SAVE MONEY. J. F. DAVIDSON, 6CEK, BOX 216, KINGMAN, ARIZONA.

New General Electric 1/2 H.P. 110-220 Volt 60 cycle 1750 R.P.M. Single phase repulsion induction motors. These are late type 40 degree continuous duty motors all in original boxes. Price \$29.50 each f.o.b. Chicago. 25% with order, balance C.O.D. Quantity limited. Also other sizes. Queen City Electric Co., 1734 W. Grand Ave., Chicago, Ill.

ALWAYS MENTION Q S T WHEN WRITING TO ADVERTISERS

ATWATER KENT Parts at one-third off list. If you want a real coupler here is your chance. Send for list. Shipped COD. Van Blaricom, Helena, Mont.

RADIO SALESMEN and SET BUILDERS—We need you and you need us. If you are reliable and well known in your community, we will appoint you our representative and furnish you with standard well advertised sets and parts at prices that will enable you to sell at a handsome profit. Write at once for catalogue and sales plan. Waveland Radio Co., Div. 43, 1027 N. State St., Chicago, Ill.

UC1831 4000v variable TRANSMITTING COND. with **DIAL**—\$2.00 S.P.D.T. 17 in. 100 amp. 600v **LIGHTNING SWITCH**—\$1.00. Postpaid. **STATE RADIO CO.**, 286 Columbia Rd., Dorchester, Mass.

WANTED—5KW, 110 volt or 220 volt, 60 cycle generator; Morsemer Engineering and Research Laboratories, Grantwood, N. J.

WANTED—honeycomb coils—all sizes, also long wave receiver—describe fully—Baima, 1WB.

SELL CHEAP—200 watt transformer, pair "S" tubes, signal change over switch; aerial ammeter; Milliammeter, real equipment—write, Harold Pirie, Fort Dodge, Ia.

SUPERHETS—Everything for that Superhet. UV1716 half price. All parts guaranteed, Transportation **PREPAID**. Write for special bargain list. Nearly all original package stuff. 20% or more on any radio material. Only highest grade apparatus and at lowest prices. Join our Exchange Club, details on request. Terms 2% cash or C.O.D. **R. P. BARROWS**, 4 Columbia Road, Portland, Maine.

ADVANCE SINK rectifier practically new; complete \$25.00; four extra brushes; Carl Sipe, Box 172, Somerset, Pa.

WANT COMPLETE Five to fifty watt CW and phone transmitter. Must be priced reasonable. Clyde D. Larimore, 408 E. 11th St., North Platte, Nebr.

WANTED— $\frac{1}{2}$ H. P. SINGLE PHASE 110 V. 60 CYCLE MOTOR—8COQ.

FOR SALE—Grebe CR 5, \$35.00; Grebe CR 8, \$40.00; Grebe amplifier, \$20.00; Guaranteed, half cash, bal. C.O.D.—**J. Wilson Morrow**, Wernersville, Pa.

"6BJX for a REAL QSR".

Fifty Watter New \$18.00. U.P. 1016 Transformer New \$18.50 R. 3 Magnavox \$17.00. 7A Power amplifier with tubes., \$35.00. First order gets these bargains. **9CKJ**, Russell, Kansas.

UV204, \$42.00 excellent condition; three U.V. 217 Kenotrons, \$10.00 each, brand new; 100 watt transmitter 2000 miles radius, complete with tubes \$65.00; 2BYA, **Burton T. Vall**, 1761 State, Schenectady, N. Y.

FOR SALE—Crosley VI, New used 2 weeks, price \$19.50 **R. Creter**, 3200 Third Ave., Bronx, N. Y.

HIGHEST OFFER TAKES—one fifty watter—NEW; H. W. Ammeter—5000 ohm grid leak; Acme trans. 1500 v.; Two Mercury Cond.; one Neutrodyne; one— $\frac{1}{2}$ K. W. trans.; Practical H. P. motor 8000 RPM; **C. Wiehe**, 122 Albert St., St. Bernard, O.

WILL pay fifty cents for January 1924 copy of QST. **R. H. Watkins**, Winona, Minn.

4—50 watt **W.E. Sig. C.** Tubes brand new. Guaranteed perfect article. Money refunded if not as represented. \$25.00 each. **G. E. Nothnagle**, 12T es 1PA.

FOR SALE—10D Western Electric loudspeaker; Haynes Griffin super; D-10 DeForest Reflex Receiver; Baldwin Phones, Western Electric Aviation Phones; Stromberg Carlson phones; Baldwin Phonograph attachment; VT -1 Signal Corps Tubes; Radiotrons; Amplex AF transformers; DeForest HC Mounting; RCA CW transformers; Microphones; Weston meters, 160 A Fda; Power amplifiers; Radiola V; 1V; Federal 69, bargains; **Robert Searing**, 1213 Gray Ave., Utica, N. Y.

ALWAYS MENTION Q S T WHEN WRITING TO ADVERTISERS

Transmitter, 10 watt phone and I.C.W., with Kenotrons. All complete ready to use. A fine outfit. Parts cost \$185. My price \$70.00 or trade for good Super-Heterodyne. **Gerst**, 2674 W. 25th Street Cleveland, Ohio.

TRANSMITTERS—everything for the transmitter, tubes, meters, transformers, generators, etc. **Morsemer Engineering and Research Lab.**, Grantwood, N. J.

GREBE 13 New—\$50.00 cash. **J. R. Harper**, 1335 Park Ave., Washington, D. C.

WANTED No. 2 Omnigraph, **Ryan Shoe Co.**, Hannibal, Mo.

LOW LOSS coils of the basket, spider web or pickle bottle type can be easily and quickly wound on Trirad coil winding forms. Accurate spacing of steel guide pins insure well built and uniform coils. Write for more information, **J. Zied**, 530 Calowhill St., Philadelphia, Pa.

REMLER, GIBLIN and DeForest coils, new, mounted only few left as follows.—100-150-200-300-400-500-750 turns half list price. Postage extra. **Geo. Schulz**, Calumet, Mich.

GREBE "RORK"—new take \$30.00—or trade for transmitting parts 1AEL.

Marconi—Army receiver 50-225 meters unused with instructions. Bargain \$75. Telefunken wave meter range 80-56,000 Five coils, meter, no curves, \$35. **Radio 2TU**.

Trade or sell Grebe CR3 Special detector two step \$40. want MG: Tungar Charger (15 Battery) \$75. Miho Battery-Starter test set has 0-3-30 voltmeter 0-300 ammeter \$40. **C. Sauerwine**, 725 New St., Allentown, Pa.

TRANSMITTING INDUCTANCES. Duplicate of RCA UL-1008, \$7.50. Clips extra, 40c each. Make your own inductance, copper strip 1/16 by $\frac{1}{4}$ inch, edgewise wound, 6 inches inside diameter, per turn 12c. 4 inches diameter 10c. Straight strip for pancake coils, per foot 6c. Postage extra. Send for the **HAMALOG**. **E. F. JOHNSON**, 9ALD, Waseca, Minn.

CEDAR RADIO CABINETS—manufacturers of Radio Cabinets built from cedar wood. We sell direct to the consumer which gives you the profit enjoyed by the dealer. These cabinets are remarkably low priced considering quality, construction, etc. All cabinets are built to suit your requirements. Send panel sizes for prices. All cabinets shipped on approval. **Manheim Woodworking Co.**, Manheim, Pa.

IVORY RADIO PANEL—Grained white "IVORYLITE" makes most beautiful set of all. Guaranteed satisfactory. Any size $\frac{3}{16}$ " thick sent prepaid 3c per square inch. Sample free. **E. P. Halton**, Dept. T, 814 Main St., Fort Worth, Texas.

9AP SELLING OUT. Write for list.

SEND TWENTY-FIVE cents silver for simple formula that easily removes green deposit from storage battery terminals. **Theisen**, 3415 Meade, Denver, Colo.

DID YOU KNOW THE CODE BUT SOMEHOW FAIL TO PASS? Many Previous Failures thanking us for License have told story of **QUICK SUCCESS**, which will mail on request. Method \$2.50 Kills Hesitation. **Dodge Radio Shortcut**, Mamaroneck, N. Y.

ARE YOU ANCHORED AT 10-15 PER-REPORTS FROM OTHER HAMS WHO BY BRIEF STUDY AND LIMITED PRACTICE INCREASED AND IN SOME CASES DOUBLED SPEED MAILED ON REQUEST METHOD \$2.50 KILLS HESITATION, **Dodge Radio Shortcut**, Mamaroneck, N. Y.

KNOW THE CODE OUR WAY—KILL HESITATION. Ask for list many students who won appointment as O. R. S. A.M. **RADIO RELAY LEAGUE** and have reported made rapid progress to quick success—mailed on request. Method \$2.50. Kills Hesitation. **Dodge Radio Shortcut**, Mamaroneck, N. Y.

MASTER CODE IN FIFTEEN MINUTES—10 WORD SPEED in three hours. These world records made by our students. New 1924 Honor Roll tells code learning story as reported by two hundred students all now licensed; some in each radio district; copy free on request; method \$2.50; kills hesitation; **Dodge Radio Shortcut**, Mamaroneck, N. Y.

SACRIFICE MUST SELL Kennedy Universal 110 and 525 Amplifier \$80.00, cost new \$370, excellent condition Circassian Walnut Cabinet, same as advertised in January Q.S.T. page 65. **ACT QUICK** George Bryce, Bristol, Conn.

HAM SUPPLIES—5-A-G-Q HEARS NEW ZEALAND ON ROICE 201A TUBES—SO CAN YOU \$2.50, ROICE 5 WATT TUBES \$3.00, C-G 201A SPECIAL TUBES \$1.10, JEWELL 0-500 MILLIAMETERS \$6.95, 0-15 AC VOLTMETERS \$6.95, No. 12 ENAMELED WIRE CENT A FOOT, CP SHEET ALUMINUM SQUARE FOOT 85c, "CP" SHEET LEAD SQUARE FOOT 85c, "S" TUBES PAIR \$20, CARDWELL .00025 CONDENSERS \$3.95, MAERSCH 10" PLATE GLASS INSULATORS 35c, VIBROPLEX \$7.50, CURTIS-GRIFFITH, 5-A-Q-C—5-R-V., 1109 EIGHTH AVENUE, FORT WORTH, TEXAS.

Plate Glass Panels at reasonable prices, beautiful, distinctive. We drill any size to order. Send paper pattern for prices and particulars. Fransen's Specialty Shop, 725 Thurman St., Portland, Oregon.

THE OLD MAN SEZ: "WHAT IS SO RARE AS A SET IN TUNE?" "UZA WAVEMETER." NO HORACE A WAVEMETER HAS NOTHING TO DO WITH THE OCEAN BUT IS USED TO KEEP THE RADIO INSPECTOR FROM NAILING UP THE DOOR TO YOUR SHACK. BETTER GET ONE OM AND FIND OUT WHERE YOU REALLY ARE. WE HAVE SEVERAL GOOD ONES IN STOCK. THE GENERAL RADIO TYPE 174 WILL COVER FROM 75 TO 1500 METERS AND COSTS \$68. THE TYPE 247W COSTS \$10. THE JEWELL HAM SPECIAL SELLS FOR \$20. ARE YOU STILL CUTTING UP THAT LEAD AND ALUMINUM? THEN GIVE YOURSELF A REST. CUT TO SIZE AND DRILLED READY TO PUT IN THE JARS. INCREASED PRODUCTION MEANS LOWER PRICES. 1" x 4", 12c pair. 1" x 6", 15c pair; 1 1/2" x 6", 18c pair. ALUMINUM IS PURER THAN IVORY SOAP, BUT IT WON'T FLOAT. FOR THE BIRD THAT WANTS TO WHITTLE UP HIS OWN ELEMENTS. 1/16", 90c SQ. FT. 1/8" LEAD 90c SQ. FT. WHY ROLL YOUR OWN? BUY THEM READY MADE. HOOPS MADE OF HEAVY COPPER BUS BAR. STRONG YET LIGHT. 8", \$2.50, 18", \$3.00, 30", \$3.50. PRICES ON OTHER SIZES ON APPLICATION. NO. 12 SOLID COPPER ENAMELED WIRE 1c FT. 500', \$4.75, 1000', \$9.25. NO. 10 (FOR HEAVY DUTY) 1 1/2c FT. PYREX INSULATORS 8" \$1.50, 4" 45c. OB's 5", 75c. 10", \$1.50. CARDWELL TRANSMITTING CONDENSERS, \$15. PYREX STAND-OFF INSULATORS \$2.50. GAROP-PYREX SOCKETS \$1.50. BREMER-TULLY SHORT WAVE COILS \$5.00. GREBE CR-3 TUNER \$35. NO. 16 COTENAMER FOR THAT SHORT WAVE TUNER 75c LB. WILL SEE YOU NEXT MONTH AGAIN OM. E. J. NICHOLSON, 8BIN. EVERYTHING FOR THE HAM. 1407 FIRST NORTH ST., SYRACUSE, N. Y.

A.R.R.L. STATION EMBLEMS finely engraved on 3" x 5" selected walnut formica, with ur call letters, \$1.00 postpaid. "Hang 'em in ur shack". A. L. Woody, Homewood, Illinois.

LOW LOSS Coils and Tuners. Amateurs specify wave length. Radio frequency units, \$2.00; Double circuit, \$4.50; Three circuit, \$5.50. Broadcast add \$1.00 more. Money orders only. H.S. Radio Shops, 2420 Fulton Ave., Davenport, Iowa.

RADIOLA AA 1520 3 stage Radio Frequency Amplifier like new, list \$80.00, sell for \$30.00, \$5.00 deposit, balance C. O. D. subject examination. Geo. Schulz, Calumet, Michigan.

US Navy Dynamotors built by General Electric 24/1500 volt .333 ampere, 6000 RPM 750 volt tap. Triple commutator. Ball bearings. Little filtering required, 672 000 breaks per minute. Original boxes \$45. Limited number slightly used \$25. Guaranteed perfect. Adapted for belt drive making a double current generator \$3.00 additional. **IDEAL FOR 32 VOLT PLANTS.** Give very satisfactory results belt driven. Operate on 6 volts generating 300-400 volts, 8-450-550, 10-575-675, 12-700-800 volts, etc. Holtzer-Cabot 12/500 volt .07 machines \$18.00. Crocker-Wheeler 1/4 KW 500 cycle generators with exciters \$20. Heavy ship models motor-generators rated at 1/2 KW but good for 1 to 2 KW \$65. Navy

106

Flame Proof Key with Blinker Light COD \$1.50 Henry Kienle, 501 East 84th street, New York.

TELEGRAPHY—Radio or Morse Taught at home. The Famous Learn-O-Graph is now available to beginners. This is the marvellous automatic teacher used by professional telegraphers to increase their ability. It does not merely teach the code. It develops Telegraphic Specialists. It is the only instrument that sends messages in message form. The most expert telegrapher can increase his ability with this instrument. Send for Booklet Q. Learn-O-Graph Co., Ridgefield Park, N. J.

STANDARD NAVAL ELECTROSE INSULATORS, guaranteed new and perfect, 12 and 18 inch strain type, \$1.50 and \$2.25 each respectively. 7 1/2 inch disc type, \$5.25 each. Several S. E. 143 Naval receiving sets guaranteed new and perfect, \$250.00. 1 and 2 Microfarad Bypass condensers \$1.00. 201A tube tubes \$3.00. 5 tube Neutrodynes \$65.00 also 5 tube tuned Radio Frequency receivers. Forward your orders, we can fill them promptly. Terms—C. O. D. Money orders, Express Collect. Peerless Radio Laboratories, 208-25 104th Ave., Bellerose, L. I. N. Y.

WIRE, WIRE, WIRE. They want to know at the factory how Johnson up in Waseca can use up so much of it. We'll tell them—it's because the Hams like the stuff, they like the price, and they like the service. Price of copper's going right up, but No. 12 solid enameled wire is still \$6.90 per thousand feet here, and 75c per hundred for less. Any length coil in one piece. No. 14 enameled only \$5.00 per thousand or 55c per hundred; Magnet wire too, any size from 10 to 30 No. 16DCC for example 65c per pound. 60 strand wire for 9APW's short wave inductance. \$1.00 per 100 ft. spool; Put some Sure Fire 20 inch porcelain insulators in that aerial. High class stuff to fit a Ham's pocketbook, \$1.00 each for four or more, or \$1.15 for less. Shorter ones 5 1/4 inches long, FB for aeriels and counterpoise, the real dope for guy wires, 30c each, 20 or more, 25c each; Allen-Bradley Radiostat for filament transformer primary \$6.50. E-210 Bradleystat, for up to 75 watt transformer, \$4.00; New Type Bradleystats for any receiving tube, \$1.85; Real low loss sockets, Garop Pyrex, \$1.50, Fleron porcelain 65c; RCA 5 watt grid leaks \$1.10, 50 watt \$1.65; Pure aluminum 1/16th inch thick 75c per square foot, lead 90c; UC-490 1 mfd 1750 volt filter condensers \$2.50, Western Electric 1 mfd 1000 volt condensers \$1.90. UC-487 1/2 mfd 750 volt condensers 85c; UC-1806 .002 mfd 6000 volt grid or plate condenser, get some before it's too late at only \$1.50; UC-1831 antenna series variable condensers \$2.25, UC-1015 three capacity fixed series condenser, will stand 7500 volts, \$2.25; UC-1846 filament bypass condenser \$1.25; PR-535 5 watt rheostats \$1.20; Signal keys, contacts of ample size, \$2.25; Ballantines Radio Telephony for Amateurs, \$2.00; Newest Citizens Call Books, including Amateur Section, 75c; Bremer-Tully low loss Ham tuner, \$4.50; RCA meters, 0-1500 volts DC \$17.00, list \$40.00, UM-533 0-5 hot wire ammeter \$2.00; Jewell milliammeters and AC filament voltmeters, \$7.15, Thermo-ammeters \$11.40; Drop a card for the HAMALOG, the real Ham Catalog, for lots more like the above. We'll ship C. O. D. if you wish, but if you send cash, please include postage. E. F. JOHNSON, 9ALD, Waseca, Minn.

MOTORS \$2.98 Good Practical twentieth horsepower, 115 volt alternating direct current. Order NOW, Pay Postman. Jewel 5 Ampere T. C. Ammeter New \$9.00. Radio Bargains. Perry Trading Co., Dept. T., 815 Lake, Racine, Wis.

SELL RCA THREE STAGE RADIO FREQUENCY UNIT EXCELLENT CONDITION, CHEAP. WANT LONG WAVE LOOSE-COUPLED. HARLAN CROWELL, Wayne, Penna.

Thordarson filament transformers 150 and 250 VA \$10.00 each. Radico 500 150 watt generator with shunt field rheostat and 110 volt 60 cycle motor \$40.00. First cash takes them. P. Westcott, 928 N. Grove Ave., Oak Park, Illinois.

ters designed, built and installed. Any wave length or power. Short waves our specialty 2 to 10 meters, etc. Morsemer Engineering and Research Lab., Grantwood, N. J.

BARGAIN: Emerson Motor Generator (four hundred watt, one thousand Volt, sixty cycle, meters and trans-

ALWAYS MENTION Q S T WHEN WRITING TO ADVERTISERS

mitting parts. All in perfect condition. Paul Ring, 199 Mass. Ave., Boston, Mass.

USE BETTER HAM STUFF AND GET MORE FB REPORTS. IF YOU BUY CHEAP STUFF NOW YOU'LL BUY THE BEST LATER, SO BUY IT FIRST. WE SUPPLY HAM EXCLUSIVELY. PYREX INSULATORS, SWITCHES, METERS, ANY TYPE AND MAKE. CARDWELL TRANSMITTING CONDENSERS. POWER UNITS TRANSFORMERS. TUBES. CHOKES. MOTOR-GENERATOR SETS, ESCO. COMPLETE TRANSMITTERS RECEIVERS. WE BUILD INDUCTANCES OF ANY TYPE COUPLED INDUCTANCES. \$11.50. SPEECH AMPLIFIERS TO GET THAT FONE ACROSS. "S" TUBE UNITS COMPLETE. ANYTHING SHOWN IN QST BUILT TO ORDER. WE ALSO CHANGE OVER ANY TYPE OF RECEIVER FOR THE SHORT WAVES. KEEP PEACE ON THE AIR AND GET THAT "AIRCRAFT OUTFIT" DOWN FROM 300 METERS. WE CHANGE 'EM OVER. WE BUILD MOST ANY TYPE TRANSMITTER FROM 5 WATERS UP. IF YOU HAVE THE PARTS SEND THEM IN. PRICES RIGHT FOR WIRING. ALSO WAVE METERS FOR THE LOWER WAVES AND MOST ANY TYPE OF RECEIVER. ALL BUILT TO ORDER TO SUIT YOU. GET THE DOPE ON THE SUPER-HET THAT GOES DOWN. BELOW. 50 METERS. FOR FB ON HAM STUFF GET QSO WITH THE ONES WHO MAKE TO ORDER AT A SATISFACTORY PRICE. WE SPECIALIZE IN THE HAM LINE EXCLUSIVELY. SPECIAL EQUIPMENT TO ORDER. SEND US YOUR INQUIRIES. ESTIMATES GLADLY GIVEN. GET QSO. ENSALL RADIO LAB., THOS. ENSALL, 1208 GRANDVIEW AVE., WARREN, OHIO.

BARGAINS!!! 5 Watt Set complete, New Apparatus—RCA, GE & GR. Established CROSS-CONTINENTAL Records \$30; also 10 watt hr: 100 V.—DC Generator \$10; Small Speed Motor 4 ur Chopper; \$4; RCA 30 & 40 Henry Chokes, New \$8; 3 New 5's \$4; RCA PT537—7.5 to 15 Ampere Rheostats \$7.50; Genuine Audiotron \$4; New DX TRON 1 1/2 V. Tubes—equal to 6 Volters \$3. ACT QUICK. 3BOV—S. Strobel, 3923 N. Sixth St. Phila., Pa.

For Sale De Forest 250 watt input tube \$35.00, RCA inductance \$7.00, 0-3, 0-10, 0-15 \$7.00. Jewell TCA 0-25 \$10.00, \$250 watt 8000 volt transformer \$20.00, 204 sockets, sink rectifier and rheostat for U.V. 204, \$5.00. 9CVO.

50 STANDARD 201 A tubes. New. \$2.25 each or \$100 for the lot. W. Linscott, 1168 Maysville, Zanesville, O.

FOR SALE—Grebe CR-5—\$50 home made three circuit tuner and 2 step \$25; Magnavox type A2R-550; Magnavox tone arm—\$25.00; Westinghouse 100 watt 500 volt m-g needs repairs \$25.00; Eveready 80 ampere hour 6 volt storage battery—\$10; Selye Whitmore, 110 Dartmouth St., Rochester, N. Y.

FIRST \$55.00 takes my brand new GREBE CR-5 and RORK amplifier. Leslie Johnson, 664 Asbury, St. Paul, Minn.

BAKELITE STRIPS—for sub panels and antenna insulation to 5" wide any length 3/16 inches thick 100 square inches \$1.25 prepaid. Geo. Schulz, Calumet, Mich.

FOR SALE—2 S tubes type No. 4000 \$15, 3 Jewell meters, A. C. voltmeters 0-10 \$4; thermocouple ammeter 0-2.5 \$7; milliammeter 0-2.50 \$4; six 1 mfd. condensers tested to 1750 volts \$8; H. J. Halliwell, 7633 Tioga St., Pittsburgh, Pa.

GREBE CR-8 slightly used \$50.00. Send check. C. M. Kelly, 21 Fairview Ave., Tuckahoe, N. Y.

FIFTEEN BUCKS TAKES BRISTOL POWER AMPLIFIER COST \$25; WANT PLATE TRANSFORMER FOR FIVERS. CARL ANDERSON, THIRD ST., MARIETTA, O.

FOR SALE—Radio parts cheap. Selling out. Albert Harvey, Lake Worth, Fla.

BEST OFFER takes CROCKER-WHEELER 1/4 HORSE POWER 220 V.D.C. motor new. James Lazzatti, 38J, Finderne, N. J.

ALWAYS MENTION Q S T WHEN WRITING TO ADVERTISERS

FOR SALE—Paragon radio telephone transmitter type 2-5U—excellent condition, \$25.00—JOHN BERGEN, Port Jefferson, N. Y.

POWER TUBES—repaired, any size or make. Power tube consulting and experimental work carried on. Morse Engineering and Research Lab., Grantwood, N. J.

GENUINE EDISON type A-6 245 amp. hour cells cost \$29.50 per cell. Will sell cheap—have 52. How many? 7-AJT.

WANTED TO HIRE—Omnigraph. L. SAMUEL, 6 Edgewood Park, New Rochelle, N. Y.

FOR SALE CHEAP—miscellaneous Jewell and RCA transmitting apparatus. Write J. R. Harper, 1385 Park Ave., Washington, D. C.

WANT—10 watt C. W. transmitter. Trade: Grebe CR-8 and two step. Schindler, 116 Rebecca Ave., Scranton, Pa.

FOR SALE—Grebe CR-8 \$50.00; CR-7 \$90.00; Western Electric loud speaker type 10-D \$30.00; Green two stage amplifier \$15.00; wanted CW transmitter 5-20 watts, John Buttrick, Franklin, N. H.

GENUINE SILICON Transformer steel cut to order 25 cents lb. 10 lbs. and over, 4 cubic inches, weight 1 lb. postage extra. Geo. Schulz, Calumet, Mich.

ALL NEW—NO JUNK—Grebe CR-12 \$75.00; CR8 \$46.00; Proudfoot detector amplifier unit \$16.00, RCA 3-tube R.F. amplifier \$17.00; Acme R-2-3-4 at \$3.00. Audio \$3.90 each; 8 new 199 and 201A Radiotrons \$3.45 each Fada 160 receiver \$96.00; Stelzer, 122 S. 15th Ave., Maywood, Ill.

QSL cards, prices as low as 75c per 100; free samples on request; 1-AOP, T. Parker, 23 East St. Fitchburg, Mass.

BARGAIN—Mignon Receiver 3000—21000 meters \$40.00, cost \$100. Navy receiver CN 113A 300-2500 meters \$18.00; Olson, 528 Market, Portland, Oregon.

TRADE good 5-dial Omnigraph for 203-A bug, S tubes, Balkite charger; make offer. Emmy Stuedle, 8014-1/2 S. Vermont, Los Angeles, Calif.

FOR SALE—20 watt c. w. transmitter complete with microphone, key, meters, and transformers. All in excellent condition, first money order for 50 dollars takes it. R. Voigt, 1314 Clinton St., Sandusky, O.

SELL—spare parts very cheap. Send for list. C. Fingar, Hudson, N. Y.

FOR SALE—New Kenotron UV-216, \$5.00, 9DRM, N. Manchester, Ind.

DeForest D.V. 2 tubes, 6 volts, .25 amp. all new and guaranteed perfect while they last. Only 2.75, act quick. M. Martin, 357 W. 34th., New York City.

GENUINE tubes. 11's and 12's bakelite bases. Each guaranteed at \$2.00; Ben's Radio, 411 Badger Ave., Newark, N. J.

Edgewise wound copper ribbon the only really satisfactory antenna inductance .350" wide; 4 1/4" outside diam. 18c turn; 5 1/4" outside diameter 15c turn; 6 1/4" outside diameter 17c turn; 7 1/4" outside diameter 20c turn, prepaid any number turns in one piece; Geo. Schulz, Calumet, Mich.

SELL—5 watt transmitter complete cheap—write for list on ham stuff. TOM KINDEL, Carlsbad, N. Mexico. 5ARR—what have you to trade?

FOR SALE—Grebe Hazeltine receiver detector and 2 stage amplifier range 600—25000 meters, price \$150.00, also Grebe Radio Frequency unit Rorn, price \$30.00—P. A. Juley, 219 E. 39th St., New York City.

EDISON ELEMENTS 5c per pair. Co-operative Merchandise Co., Chelsea, Mass.

FOR SALE—UV202, 5 watt radiotrons, power tubes three dollars each; (Limited supply 1000) these tubes never used. Morsemer Engineering and Research Lab., Grantwood, N. J.

GREBE 13 New; first check for \$35.00 takes it or will ship C.O.D. S. L. Ecker, Sedan, Kansas.

FOR SALE—20 w. transmitter complete with 2—500 v. motor-generators, tubes, microphone — key; all mounted ready to work—fine DX record \$175.00, Louis E. Seever, Jr., 126 N. 4th St., Clinton, Ia. Radio 9AXD.

CHEMICALLY PURE ALUMINUM $\frac{1}{8}$ inch \$1.80 1/16 inch 90 cents; sheet lead \$.95 per sq. foot, postage paid. Geo. Schulz, Calumet, Mich.

EDISON ELEMENT storage B batteries assembled and wired—save you time, trouble and worry; only first grade elements used, 100 volt, type "A" unit in oak rack, \$12.00; super-heterodynes and neutrodynes need a heavy duty B battery; 3 positive and 2 negative plates in a 1" container answers the question; 100 volt heavy duty type complete, \$18.50, 140 volt, \$24.00; sample cell 25c; every battery guaranteed; write for complete list of batteries and parts. J. Zied, 530 Callowhill St., Philadelphia, Pa.

OMNIGRAPHS bought and sold, Ryan Radio Co., Hannibal, Mo.

Flash sets, bombarding outfits, high frequency furnaces. Our bombarding outfits just the thing for the independent tube manufacturer. Morsemer Engineering and Research Lab., Grantwood, N. J.

OMNIGRAPH WANTED—give type, condition, number of dials, and price. Geo. Bowman, 1688 Del Mar Ave., Fresno, Calif.

FIVE WATERS—See last month's ad. also look for next months. Sent to you C.O.D. \$3.50 and parcel post. Your money back if you are not satisfied. Don't go on forever with the idea in your head that you HAVE to pay a high price for a good five watt. \$3.50 is enough and we will prove it. And by the way, did you ever buy a high priced one on a money back basis? MAYBE. Almost once. RADIO VACUUM TUBE COMPANY, 55 Halsey St., Newark, N. J.

RADIO CORP. BARGAINS, METERS, ETC. Look at these Prices—Meters UM553 \$2.25, UM578 \$10.25, UM-579 \$11.45, UM580 or 581 \$10.25. UP1653 Power transformers \$10.95. UC1015 Condensers \$2.75. 600 volt Westinghouse ground switch \$1.60. Write us for others. A real ham store. The Radio Service Store, 108 E. Front Street, Bloomington, Illinois.

HAME: Get our Samples and Prices on Printed Call Cards made to order AS YOU WANT THEM. Radiograms 25 cents per 100. Hinds & Edgarton, 19 S. Wells St., Chicago, Ill.

FOR SALE—SOME MEYERS TUBES NEW, \$2.95. Trimp, 925 Cortland St., North Bergen, N. J.

2RCA transmitting cond. W.C. 1831 John Firth 0-600 DC voltmeter. U.P.1368 550 volt 325 watt R.C.A. Hi-voltage transformer. RCA 8 watt sockets. W trade for fifty W.E. or R.C.A. Best offer takes them. H. C. Block, 1 Oak St., Ypsilanti, Mich.

REAL HAM WAVEMETERS, range 15-220 meters, built the way QST says is right, in a 6 x 7 cabinet, accuracy guaranteed within one percent, curve chart furnished. \$7.00 postpaid. Edward Bromley, Jr., Whitewater, Wis.

EDISON A BATTERIES FOR SALE. BATTERY CONSISTS OF 5 A-8 CELLS WITH NEW CASE, SOLUTION & CONNECTORS, IN PERFECT ELECTRICAL & MECHANICAL CONDITION. CAPACITY 300 AMPERES AT 6 TO 8 VOLTS. MANUFACTURERS PRICE NEW \$190. MY PRICE ON A FEW SETS \$56 F. O. B. DETROIT. COMPLETE BATTERY WEIGHS 150 LBS. BERNARD T. STOTT, 60 PALLISTER AVE., DETROIT, MICH.

RADIO CARDS—8 big favorites—Large red call letters—60c per hundred, up Radiograms, 20c per pad; letter-heads and envelopes, BCL cards. Lowest prices, yet BEST QUALITY. Send your orders now. THE ARTHUR PRESS, 1453 ARTHUR AVE., LAKEWOOD, OHIO, Branch Office: 54QF.

100—GENERATORS. GN2—\$10. special price in lots of five. Kenetrons \$2. UC1831 transmitting condensers \$2. UC1819 \$2. 900 cycle spark or ICW sets \$20. Western Electric condensers 1mfd 75c. $\frac{1}{2}$ mfd. 50c—3amp. choke \$1. Bakelite leadin insulators signal corp. 50. Telefunken detectors standard base 5v \$2. Radiola 5es \$32. 6es \$28. $\frac{1}{2}$ hp motors. General radio 12 step inductance. R. Wood, 38 WAY AVE., Corona, N. Y.

New Generators 30v input 300v output \$3. Battery charging dynamotors input 220 dc output 9v at 5 amp. \$15. W. ELECTRIC 151 E108 New York.

SELL—Atwater-Kent Model 9, complete, \$100.00. Write for particulars, P.O. Box 976, Danbury, Conn.

SUPERHET Transformers. One set Frederick transformers with oscillator and antenna coupler. Real stuff, \$12.50 with diagrams. Can be used in Ultradyne or Standard super. Shipped COD. Van Blaricom, Helena, Mont.

FOR SALE—RC parts for twenty watts, half horse A/C motor; telescope, Omnigraph, four foot lathe. All cheap. Lewis, Proffit, Va.

WANTED—Model FOUR CORONA typewriter, first class condition. C. T. ASMUSSEN, 130 Marsteller St., West Lafayette, Ind.

\$5.00 New United States Government Aviators' leather Helmet with headphones and microphones, cost \$25.00. Postage free. Send at once, limited supply; other Government Radio bargains. Send stamp for Hist. WEIL'S CURIOSITY SHOP, 20 S. 2nd St., Philadelphia, Pa.

FOR SALE TRESKO ALL-WAVE TUNER, detector and two-step. 170-25,000 meters. DX: Many 6's and 7's; Broadcasting, LONDON; Long waves, HAWAII in the DAYTIME. Bargain, \$75. sDOE, Fairgrove, Mich.

CODE MADE EASY and interesting. Alphabet in 15 minutes. Original. New Rhythmic Memory system. Copyright, \$1.00. Cheques \$1.10. Dept. Q, Kwikkode, 724 Beresford Ave., Winnipeg, Man., Canada.

NEW UP1627, 40 henry 300 milliamp choke coil, \$3. Also used 260 watt Acme, \$10. Or trade for filament transformer. A Carr, Leon, Iowa.

For Sale—3000 Volt 2000 Watt 1750 R.P.M. double commutator Generator only with coupling and field rheostat \$165.00. Also 2500 Volt 2000 Watt 1750 R. P. M. motor generator set, Motor direct current 110 Volt \$150. Queen City Electric Co., 1734 W. Grand Av., Chicago, Ill.

SELL—neutrodyne, five tube, best parts \$30.00; audiotron, two filaments, best offer. Robert McCracken, Cuyahoga Falls, Ohio.

PUREST VIRGIN ALUMINUM FOR SALE. PARTICULARS UPON REQUEST. 2EM.

NOTICE—A card from anyone hearing SSD or 3XX will be appreciated by the owner of these stations. Special apparatus is being used. C. A. Johnson, 5332 Gainor Road, Wynnefield, Philadelphia, Pa.

Rotors, hard rubber for three inch tubes. 50 cents each. Bakelite tubing $\frac{3}{8}$ by $\frac{5}{8}$ " drilled for rotor shafts; also all hardware for quick assembly. Quantity prices The Carter Mfg. Co., East Cleveland, Ohio.

—PEPPO—"Non plus ultra"—PEPPO puts a lasting and tremendous "Kick" in ur Edison "A" and "B" Batts. A can of "PEPPO" makes five pounds of Edison solution, enough for ur 80 cell one hundred volt "B batt". Price per can (1 $\frac{1}{4}$ lbs.) \$1.25. Be sure and get "PEPPO" and refuse all weak and worthless substitutes. RADIO-TEST-TUBES especially strong constructed $\frac{3}{4}$ x 6", 5c each; SUPERIOR ELEMENTS 5c per pair, drilled 6c, wired 8c; RUBBER SEPARATORS 1/3c each; PURE NICKEL WIRE 1 $\frac{1}{4}$ per foot. Everything prepaid, attach remittance to order. Prices on all other Radio Sets and Equipment upon request. Northwestern Radio Laboratories, Radio Station 8BLR—Sole manufacturers and distributors of "PEPPO". 1695 Taylor Ave., Detroit, Mich.

CALL CARDS neatly printed with YOUR Call Name and Address red. Black printing, quality cards. Latest Design (New Postcard backs) 100—\$1.45; 200—\$2.25, 300—\$2.95; 500—\$3.95; 1000—\$6.45 PREPAID. RADIOGRAMS: Name, Address, Call, 100—\$1.35; 200—\$1.85;

ALWAYS MENTION Q S T WHEN WRITING TO ADVERTISERS

300—\$2.35 PREPAID. STATIONERY—Name, Address, Call, 100 envelopes, 100 letterheads only \$2.25; 200 each \$3.25; 300 each \$4.25. PREPAID. LOGS: Name, Address, Call, 100—\$1.45; 200—\$2.10; 300—\$2.75. ARRL emblem added whenever requested by member. SEND NO MONEY. Pay postman AFTER printing arrives. MONEY REFUNDED IF NOT DELIGHTED. Send order NOW. Postal will do. RADIO PRINTERS, Dept. 5042 C, Mendota, Ill.

WHILE THEY LAST—Reinartz's original short wave articles in September, October and November numbers of Amateur Radio. Sent postpaid for 50 cents or free with a subscription \$2.00. Executive Radio Council, 136 Liberty St., New York, N. Y.

RECEIVING AND TRANSMITTING ACCESSORIES. WHAT DO YOU NEED? I HAVE IT OR CAN GET FOR YOU QUICK. PYREX SOCKETS \$1.40 AND PYREX ANTENNA INSULATORS \$1.50. WRITE FOR COMPLETE LIST. ALL SHIPMENTS C.O.D. ORDER FROM THE SIXTH DISTRICT HAM AND SAVE MONEY. J. F. DAVIDSON, 6CEK, BOX 216, KINGMAN, ARIZONA.

Thousand volt motor-generator \$75. BARGAINS in Transmitting PARTS. Write for list. Will make TRADE for METAL LATHE. 5AAC.

A good buy—combined long and short wave receiver in one cabinet. DeForest coils for long wave. Low loss short wave set. Standard parts. Cardwell and Bremer-Tully condensers, 21 H. C. coils. Fada, Howard, Thordarson, Frost and Federal parts. Transfer switches from long to short wave 80 to 23,000 meters. \$75.00. Carl Frank, Rochester, Minnesota.

SPOKEN ESPERANTO FOR BEGINNERS—class textbook, 92 p.—56c. 2, \$1.00. Norman Frost, 12 Ash Place, Cambridge, 38, Mass.

FOR SALE—100 watt CW and phone set; 20 watt CW and phone set; one 750 volt 1500 volt motor generator, Esco generator; complete transmitting outfit, all in first class condition. 1AJT, 145 Rockwell St., Norwich, Conn.

SUPER-HET—8 tube Experimenters Model C \$150.00. Cardwell condensers—cushioned sockets—UV1716 trans., in walnut cabinet—will ship C.O.D. subject to examination. Transmitter—DeForest OT5 with two Kenotron and one UV202—\$75.00. Root's Radio Shop, Galva, Ill.

Q R A SECTION

50c straight, with copy in following form only: CALL — NAME — ADDRESS. Any other form takes regular HAM-AD rates.

u1AUR—American Correspondent, Journal des 8", Harold G. Riley, Livermore Falls, Maine.

f8SM—Sacazes Marcel, 50 Avenue Albert 1er, Castres, Tarn, France.

1ABD—Leo Charette, 17 Wamesit St., Lowell, Mass.

1AFW Richard Fontaine, 65 Davis St., Revere, Mass.

1ASN—A.L. Budlong, Glastonbury, Ct., address at Headquarters; 1DQ, J. M. Clayton, ditto; 1OX, L. W. Hatry, ditto, 1XAQ, 10A, S. Kruse, ditto.

1 BG Roger M. Spicer, 7 Miller Ave., Holyoke, Mass.

2EB—Boyd Phelps, 2120 Clove Ave., Grasmere, State Island, N. Y.

2AKD—Ludwig Leaf, 50 Gramatan Avenue, Mount Vernon, New York.

3OM—Sgt. Robert C. Baumgardner, Box 5, Fort Eustis, Virginia.

5ASU—RUSH P. POWELL, 811 Adams Ave., Montgomery, Ala.

5ATH—Wm. W. Adams, Box 214, Center, Tex.

5AUD—Rawleigh H. Ralls, 629 E. Edwards St., Edmond, Oklahoma.

ALWAYS MENTION Q S T WHEN WRITING TO ADVERTISERS

6APD—Chandler Brownell, 862 East 6th Street, Pomona, Calif.

7VG—Brunette Haberly, 122 Fifth St., Forest Grove, Ore.

8AHM—H. C. Block, 1 Oak St., Ypsilanti, Mich.

8DOF—Lawrence P. Hennigan, Eldred, Pa.

8XB-8FJ—E. Manley, Physics Dept., Marietta College, Marietta, O.

8HF—Kenneth Quigley, 206 S. Jefferson St., Ionia, Michigan.

8CFT—Kenneth Steele, 312 Hanover St., Northumberland, Pa.

8DJN—A. H. Young, Jr., 2011 Madison Ave., Huntington, W. Va.

9AOI-ex-9DTE—Jas. E. Finch, Box 43, Route 1, Wheatridge, Colo.

9BWS—Everett L. Millard, Jr., "Log House", Highland Park, Ill.

9CNP—Frits Frederickson, 101 Goodrich St., Kewanee, Ill.

9CPR—John Snow, 211 North Oak Street, Eureka, Kansas.

9DKC—A. L. Kalvin, 1419 Michigan Avenue, South Milwaukee, Wisconsin.

9DQW—Clarence W. Sherman, 1103 S. 9th St., Clinton, Ia.

9DY—1709 West Adams St., Chicago, Ill. Operators—F. Brandenburg, H. Howell, O. Luhring—ex DOF.

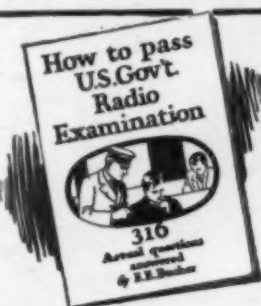
9MD—William Galper, 1448 S. Kedzie Ave., Chicago, Ill.

9NE—Erlend L. Olson, 272 Wilder St., Aurora, Ill.

1KP—F. C. Beckley, West Suffield, Conn.

9CNL—ex EFJ—A. L. Carr, Leon, Iowa.

q2MK—R. V. Waters, Galiano, No. 29, Havana, Cuba.



50c

PASS the U.S. Government Commercial or Amateur Radio License examination. This book will help you do it. Send fifty cents in stamps or coin for your copy—postage prepaid to any point in the U. S., Canada or Mexico.

RADIO INSTITUTE OF AMERICA
326A Broadway
New York City

EVEREADY HOUR
EVERY TUESDAY AT 9 P. M., E. S. T.

For real radio enjoyment, tune in the
"Eveready Group." Broadcast through
stations

WEAF	New York	WFI	Philadelphia
WJAR	Providence	WCAE	Pittsburgh
WEEI	Boston	WGR	Buffalo

*Dry "B" Batteries
are an economical,
dependable and
convenient source
of plate
current!*

No. 7111.
1½-volt
Dry Cell
"A"
Battery
for all
dry cell
tubes



No. 772.
45-volt
Large
Vertical
Price
\$3.75



No. 770.
45-volt
Extra
Large
Vertical
for heavy
duty
Price
\$4.75



No. 771.
4½-volt
"C"
Battery
improves
quality,
saves "B"
Batteries
Price 60c



There's more life in Eveready Batteries

Buy Eveready "B" Batteries and you get electricity in its surest, safest and most compact form. They reduce your operating expense. New developments in the Union Carbide and Carbon Research Laboratories, Inc., have been converted into new manufacturing processes in the Eveready factories. Good as they always have been, Eveready "B" Batteries are much better today.

The Eveready achievement of giving you more hours of "B" Battery service for less money has cut the cost of running receivers in half, and in some cases to a third.

There is an Eveready Radio Battery for every radio use.

Manufactured and guaranteed by

NATIONAL CARBON COMPANY, INC.

Headquarters for Radio Battery Information

New York

San Francisco

Canadian National Carbon Co., Limited, Toronto, Ontario

EVEREADY

Radio Batteries

-they last longer

ALWAYS MENTION Q S T WHEN WRITING TO ADVERTISERS

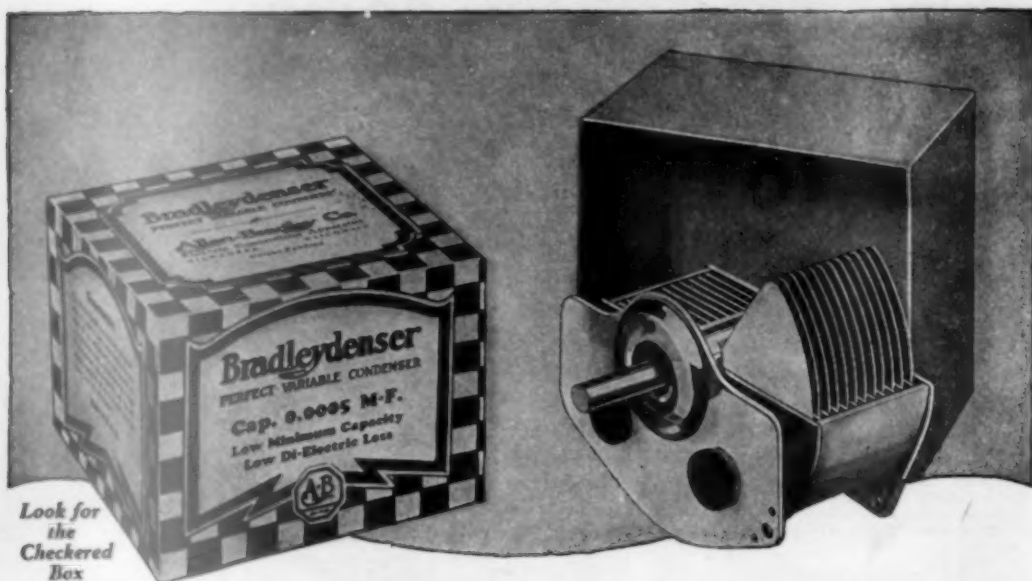
—FOR YOUR CONVENIENCE—

QST'S INDEX OF ADVERTISERS

IN THIS ISSUE

Acme Apparatus Co., The	2	Kellogg Switchboard & Supply Co.	93
Adbro Mfg. Co.	84	Kimley Electric Co.	74
All American Radio Corp.	1		
Allen-Bradley Co., The	112—3rd Cover		
American Hard Rubber Co.	76		
American Radio and Research Corp.	95		
American Transformer Co.	78		
Andrews Radio Co.	71		
Angiers, U. S. A.	74		
Apex Elec. Mfg. Co.	76		
A.R.R.L. Application Blank	64		
A.R.R.L. Emblem	94		
Bakelite Corporation	91		
Barrett & Paden	82		
Bluebird Tube Co.	78		
Box Z	102		
Brach Mfg. Co., L. S.	90		
Branston, Inc., Chas. A.	72		
Bremer-Tully Mfg. Co.	73		
Bryant Radio Tube Co.	102		
Burgess Battery Co.	63		
Cardwell Corp., Allen D.	85		
Carter Mfg. Co.	94		
Crescent Radio Supply Co.	74		
Crosley Mfg. Co.	96		
Cunningham, E. T., Inc.	2nd Cover		
Daven Radio Corp.	77		
Davis Co., James M.	84		
De Forest Radio Co.	97		
Deutschmann, Tobe C.	88-99		
Dubilier Condenser & Radio Corp.	75		
DuRay Radio Corp.	65		
Durham & Co., Inc.	98		
Eagle Radio Co.	101		
Eaton Elec. Co.	100		
Eby Mfg. Co., H. H.	86		
Electric Specialty Co.	86		
Electric Storage Battery Co., The	89		
Federal Tel. & Tel. Co.	90		
Findlay Electric Porcelain Co., The	88		
Fieron, M. M. & Co.	96		
Freshman Co., Inc., Charles	72, 86, 96		
General Electric Co.	79		
General Radio Co.	69		
Globe Radio Equipment Co.	82		
Goodman, L. W.	90		
Goyer Co., The	76		
Great Northern	100		
Gross & Co., J.	99		
HAM ADS	103-109		
Hammarlund Mfg. Co.	72		
Hull & Co., S. W.	78		
International Correspondence Schools	80		
Jewell Elec. Instrument Co.	101		
Jewett Radio & Phonograph Co., The	4		
Johnson, E. F.	94		
Manhattan Elec. Supply Co.	92		
Mason, Fenwick & Lawrence	96		
Metro. Elec. Co.	80		
Morse Twist Drill & Machine Co.	64		
Munn & Co.	92		
Murdock Co. Wm. J.	80		
Myers Co., Ltd., E. B.	92		
National Carbon Co., Inc.	110		
National Co., Inc.	81		
National Elec. Condenser Co.	99		
New Britain Machine Co.	88		
Newman-Stern Co., The	100		
Norwalk Radio Corp.	101		
Pacent Electric Co.	62		
Perfection Radio Mfg. Co.	68		
Precise Mfg. Corp.	82		
Premier Elec. Co.	101		
The Prest-O-Lite Co., Inc.	67		
QST Back Copies	68		
Radiall Co.	99		
Radio Corp. of America	4th Cover		
Radio Institute of America	109		
Radio Rabat Co.	100		
Radio Tube Exchange	98		
Radio Units, Inc.	90		
Rauland Mfg. Co.	100		
Roice Tube Co.	74		
Roller-Smith Co.	66		
Scanlon, E. P.	102		
Sharp Spark Plug Co.	101		
Stromberg-Carlson Telephone Mfg. Co.	83		
Summit Radio Mfg. Co.	98		
Super-Insulated Wire Co.	102		
Thordarson Elec. Mfg. Co.	87		
Toas Engineering & Sales Co.	92		
Tower Mfg. Co.	66		
Troy Radio Co.	70		
U. S. Tool Co.	102		
Vibroplex Co.	86		
Voigt, Geo.	78		
Western Coil & Electrical Co.	84		
Western Electrical Instrument Co.	70		
Wireless Mfg. Co., The	94		

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS



Look for
the
Checkered
Box

Brass Plates—Soldered Joints—Grounded Rotor Are Standard Features of the Bradleydenser

The Bradleydenser is a low-loss condenser with many distinctive features that insure long life and high efficiency. For instance, the brass stator and rotor plates are soldered at all joints. The plates cannot become loose, corrode at the joints or work out of alignment. The rotor is mounted on a long sleeve bearing that supports the rotor plates without the use of an outer end-plate. Therefore, the di-electric material is reduced to two small buttons. This means low loss and sharp tuning.

The stator plates are protected with a dust cap that can be detached without tools. The minimum capacity is extremely low, and body capacity effects are greatly reduced. The entire design makes for the highest efficiency in radio receivers.

*Build for
Efficiency*

This filter tuner with resistance-coupled audio amplifier is equipped with Bradleydensers. The tuning is very sharp and selective.

Allen-Bradley Co.

Electric Controlling Apparatus
277 Greenfield Ave. Milwaukee, Wis.

*Use the
Bradleydenser*



Send for the latest information on the Bradleydenser. It will pay you to know about this remarkable low-loss condenser before planning your next radio set.

The Traffic Department

F. H. Schnell, Traffic Manager
1045 Main St., Hartford, Conn.



Message traffic handling has taken on quite an increase during the last two months. In October we were around the 6,000 mark and in January we almost reached the 30,000 mark. The "DX Craze" is passing away as are the "rubber stamp" Q signals about QRK, QSA and QSB. Everybody seems to know that everybody else is QSA VY, QRK FB, and QSB ok. This all happens on the 75-85 meter band and we hope it won't be repeated on the lower bands. From the way messages reach Headquarters, it does appear that delivery has improved to a great extent. That is what we are urging all along—better message delivery and no messages to hang on the hook longer than 48 hours.

Last month 9ACI won the honor position with 335 messages. 1KV was a very close second with 333 messages. 1FM takes first honors this month with 370 messages. FB!

Y. M. C. A. 1FM
Portland, Me.
New England Division
370 Messages.

Two more members are added to the Brass Pounders' League, and the number of messages shows an increase—we look for many additional BP's next month.

Call	Messages	Call	Messages
1FM	370	8BYN	176
8AK	323	2CJX	174
9DMJ	243	9AVJ	169
9CZL	185	9CDV	166
9BVN	183	9ALI	160
9AWS	182	9DTK	156

Above are all new Brass Pounders' as no call appears this month that appeared last month. How many will stick in the League each month? Don't forget that Traffic Department Trophy which is mentioned on Page XV of February QST. The contest is on, OM, so get busy and see if you can win it. It isn't going to be easy by any manner or means—it will take real hard work to win it, but it can be done.

Your TM will be in the Pacific somewhere between the west coast and Australia about the middle of April looking for ham signals. More details next month, but the call of the floating station will be NRRL on about 55 meters QRV all amateurs any wave any time—day or night. Listening will be done on all amateur bands. Probably 20 and 40 meters in daylight and 40 and 80 at night. Keep an ear out for NRRL and send all reports of reception of two-way work to the U. S. Naval Research Laboratory, Bellevue, Anacostia, D.C.

On March 15th, our first attempts at regular weekly daylight transcontinental work will be started, to continue each Sunday thereafter. For the present, we will undertake this transcontinental communication on 40 and 80 meters, with as many routes as possible. Division Managers are to observe routes through their divisions and make them as flexible as possible. In reporting communication and contact, mention should be made of the wave-length used in each case. Every amateur should be prepared to make use of these routes for message traffic. Messages are to be

started from your own station regardless of where you are located. The idea is to establish regular Sunday schedules for this work.

Reports for the month show a decided increase in activity and since we have more space to present it, we call your attention to happenings in each of the division reports which follow.

What Is an O. R. S.—and Why?

By P. H. Quinby (9DXY), Midwest Division Manager

THE Official Relay Station of the American Radio Relay League is an appointment that is causing more or less confusion in the minds of a large number of League members and brass-pounders. The hope of clearing up this confusion and explaining the subject to the full satisfaction of all is the reason for this article.

Back in the old spark days before the war, traffic handling was not the precision-like proposition that the amateur finds today. Then it was merely a pleasure, and messages were forwarded in an easy and leisurely manner which suited the whim and convenience of the operator. If newspapers were not handy, the "hook" was often stripped to start the early morning fire in the shack. Thus, many messages went astray and were not delivered. It was beneath our dignity to mail them. They must go "a la spark" or not at all. Of course there were many operators who felt the responsibility of clearing their hook and maintaining reliable communication but such was the exception rather than the rule. We all felt the need therefore, of placing a greater responsibility upon these stations and classifying them according to their reliability. So we conceived the idea of forming regular trunk and branch line traffic routes, criss-crossing the country in such a way as to maintain reliable communication in almost any direction.

These routes were worked out in detail throughout the various divisions and occasional tests were made to demonstrate their efficiency. In these tests messages were sent from ocean to ocean and answers returned in a remarkably short time. However, as the system expanded and the stations became more profuse in numbers, the appointment grew more or less common and lost some of its value and distinction. The organization then began to lose its morale and with the oncoming of the war was, of course, completely disintegrated.

The development of radio during the war gave a new impetus to the game and the new organization jumped off to a flying start. Many new fists came on the air and appointments were granted right and left. If a man could handle a certain number of messages a month and made known his ability through his reports, he was granted an appointment without further questioning. This brought a large number of unreliable stations in our ranks, which naturally slowed up traffic and gummed the works. Something had to be done. Many complaints were received upon the unreliability of communication and laxity of message delivery. The conclusion was finally reached that a wholesale cancellation was in order so we wiped the slate clean and started all over again.

This time we compiled a set of iron bound qualifications and regulations for the O.R.S. that would make it difficult to secure in the first place, and impossible to retain in the second place, unless a certain definite code of action was rigidly lived up to by the appointees. The result was our present system of Official Relay Stations which has been in successful operation for more than a year.

The qualifications for an applicant are now as follows: He must be a League member in good standing (his appointment is cancelled if he allows his membership to lapse) his station must be reliable; his ability to handle traffic must be well established; he must abide by the law and follow the regulations of the League in letter and in spirit; his reports must be regular and accurate and without exaggeration; he must show a spirit of cooperation and loyalty at all times, keeping in mind and motto of the Three Musketeers "One for all, and all for one;" and last but not least, he must have the good will of his fellow amateurs and officers of the League with no black marks on his record. So much for the qualifications.

In order to keep his appointment, he has certain duties to perform, and failing in these, his appointment is either suspended or cancelled depending upon the nature of the offense. He must report regularly to his district officer and on time; follow promptly the instructions and regulations issued by his officers in the League; participate in League activities whenever possible to do so, and conduct his station at all times in such a way as to bring to the Fraternity pleasure, as well as honor to himself. He gets a good sized certificate to grace his station wall, which certifies his reliability and good standing as an amateur; it gives him a mark of distinction and puts him in a class above the average "ham;" and his badge of honor will carry some weight with all who visit his station, including the R.L.T. goes without saying that vacancies in League offices are filled from the ranks of the O.R.S. and in the Midwest Division at least, an amateur is not given an office in the League until he has served his apprenticeship as an O.R.S. There are numerous other advantages, such as being on a special mailing list, etc., which we cannot take space to enumerate here.

To secure an O.R.S. it is merely necessary to ask your C.M. or D.S. for an application blank, which he will furnish promptly. This should be properly filled out and returned to the C.M. or D.S. The C.M. or D.S. then investigates the qualifications of the applicant, and on finding him satisfactory, approves his application and forwards it to the A.D.M. If the A.D.M. is satisfied that the applicant is ok, he attaches his approval and forwards it to the D.M. If the D.M. finds him in good standing in the League and is satisfied with the reports of his officers, he completes the appointment, issues the certificate, and notifies Headquarters and the A.D.M. of the appointment. Of course, if a bad report comes in from one or more of the officers, the applicant is given a chance to explain his side of the question to the D.M. before a final decision is made. That is about all there is to it. The certificate becomes valid as soon as the applicant's signature and that of the D.M. and the T.M. are affixed in their proper places. It remains valid until cancelled by the D.M. or voluntarily released by the appointee.

ATLANTIC DIVISION

C. H. Stewart, Mgr.

This being the first report for this division that comes through the hands of your new manager, little time has been had to write personally to all the personnel of the division, there are, of course, many reports missing, and the old stand-bys, Maryland, District of Columbia and Eastern Penna. are the only ones coming through with complete reports. Other reports from O.R.S. have drifted through and are included. In the future, all reports must go through the regular channels and particularly on time, as reports arriving too late to be included in the regular monthly report will not go in. The new manager is going to insist on this so there may never be a time that the work of the Atlantic division falls back as it has in the past six months. Speed it up, fellows, and let's show the traffic department that the Atlantic division is again the largest and liveliest division in the country. Next month I do not want to have to report a single report missing.

EASTERN PENNA.—Despite the fact that there are but very few activities scheduled, A.D.M. Rau received quite a few reports this month. 3BNU is working traffic consistently on 80 meters, 50 watts, and has worked the west coast on a 5 watt. 3YO is QSO England. 8BMI is QSO the eastern half of the U. S. and Cuba. 8AOL tied up a few

times with England. 3AUV continues to work New Zealand stations. 8CCQ worked all districts while home from college at week-ends. 8CDM is QRD Sweden on the KXZ. (Listen for the gang, OM). 8BXW and 8AHU moved next door to each other, so in order to prevent a murder, decided to consolidate their stations. 8BFE manages to connect with British cousins using one 5 watt. These reports are made up from information given by O.R.S., and your cooperation is invited to make this division a top-notch. (Won't you please do your part, men—Tks.—Rau.)

Traffic: 3ZM, 19; 3BNU, 21; 3AVM, 22; 8AVL, 4; 3YO, 30; 3BLP, 17; 3CJN, 14; 8MQ, 5; 3TP, 18; 3UE, 5; 8AOL, 23; 3BPNU, 10; 8BML, 9; 3AUV, 15; 3ZO, 70; 3HD, 19; 3FS, 9; 8EU, 18; 8CCQ 13; 8BFE, 9.

NOTE: D. S. Oscar A. Hickey, Penna. Dist. No. 2, sent in a summary of work done in his district during 1924. This is an excellent idea and shows the interest taken by Rau's men.

WESTERN NEW YORK—The report of 8AVJ came through direct to the D.M. via the traffic manager, with a kick, this month, reporting 23 messages.

DISTRICT OF COLUMBIA—The beginning of the New Year finds approximately the same number of stations active as the district had the year previous. Nearly everyone is down on 80 meters. 3BWT goes one better, however, and is able to quickly change from the 175 meter band to 80 meters. He threatens now to break loose with a large traffic report. Hope he does. 3BWT reports working a couple of English stations. 3PZ is doing a great deal of short wave work and has been heard all over the country. He and old 3JJ are probably the only ones in the District who have made extreme short waves an earnest study. 3BPP reports he is through. 8BSS is one of the few who gave the 80 meter wave a tryout and then went back to 200. 3AB is using 75 meters flat, using a 40 ft. rain spout mast for both transmitting and receiving. He has worked New Zealand this month for the first time and the "rain spout" seems to be FB. 3CDQ, the YL of the District is on 180 but seldom heard. Too many lightning changes. 3ZW continues to be on with a regular watch and has been heard doing some good work but never reports to the A.D.M. Here is an example of an O.R.S. that does not report regularly and all O.R.S. stations should keep in touch with their A.D.M. regularly with activity reports, even if no messages are handled.

Traffic: 3BPP, 20; 3BWT, 13; 3PZ, 10; 3AB, 11.

MARYLAND—A.D.M. Deichmann seems to have trouble getting reports from the gang around Baltimore. This is largely due to the fact that Maryland, and in fact the complete Atlantic division, reports, have been omitted in QST for the past few months, and the fellows feel it has been a waste of time reporting to the A.D.M. under the circumstances. Maryland should now come forward 100% and back Deichmann up in his reports. Deichmann has been very prompt in reporting and deserves great deal of credit in making up reports with but very little to go on. The following has been made up from what the A.D.M. has been able to ascertain by listening in. 3AJD, with a big bottle has no trouble working nightly with transatlantic stations. 3LG and 3MF the same. They are most consistent. 3TE has worked DA8 and has been reported in New Zealand! 3SF continues to QSO Europe and is putting out a fine signal. 3AAM, 15 watts and 3QI, 10 watts, are two newcomers who are kicking out in fine shape on 160 meters. (Welcome, OM.) 3APT, 3WS, 3DQ, 3UZ, 3FB, 3PH, 3LL, 3DU and 3BMO are all on the job and reaching out. Fine business—but please report. 3AJO, the latest 80 meter convert is doing fine DX on a 50 watt. 3BUR a new O.R.S. at Annapolis, Md., in Dist. No. 2, with two ops., both Commercial and Midshipmen, is on regularly as time from studies will permit. 3APV fails to make his regular report this month, which has been generally sent direct to the D.M. for convenience sake. 3DW, still on 80 meters at Mt. Ranier, keeps schedule Sundays with 3HG and has reached out surprisingly well with 10 watts considering the poor location and antenna system. 3HG, the A.D.M., does not report his own work to the D.M., but it can be said that he is one of the most consistent stations working regularly with French and British hams. Since a new 250 watt has been in service and a change was made from RAC to AC he is FB everywhere.

QST FOR MARCH, 1925

Traffic: 3HG, 59; 3DW, 9;

There should be more O.R.S. appointed in all the division, and all those who have requested certificates and have not received them should please notify the new D.M. Every possible means will be taken to issue O.R.S. promptly, but the D.M. is just starting and a great deal of correspondence must be cleared up and with the present condition of the office files it will be impossible to attend to everything until things are straightened up. Be patient, fellows, write in your troubles and you will be taken care of.

WESTERN PENNA.—Dist. No. 9: Traffic reports are light this month due to two causes, the first one that most of the active stations were working as committees on the Pittsburgh convention, and the second being that A. W. McAuly, 8CEO, the new D.S., has not had the opportunity to arrange the station lists for the district and get in touch with them.

A circular letter will be prepared and a copy sent to each O.R.S. in the district.

Much interest in the short waves is being shown, especially the 80 meter band. Very few are down on 40 and it is believed that there are no 20 meter stations in the 9th district, operating regularly. 80 meters seems to be popular on account of the fact that it seems to carry well at any time of the day.

SAGO as head of the Entertainment Committee at the Pittsburgh convention has been up to his neck trying to put on a successful entertainment program and has been off the air for almost two weeks. He recently carried on some P. R.R. tests which were not very successful due to the zeal for DX which seems to be so great in this section of the country. His sibs continue to get out well and were heard at Swedish SMYY in full daylight (0901 G.M.T.) and by G6TD. 8VE-8ZAH has given up the call 8ZAH and will only use 8VE in the future. He is now using one 50 watt with a sink rectifier instead of A.C. The west coast fellows say his sibs kill their local QRM. He is working on 79 meters nightly and works the west coast with ease. He was chairman of the Reception Committee and also helped SAGO with the entertainment at the convention. 8JQ handled the largest amount of messages this month and also did the best DX. His sibs were heard at twelve places in Europe, the countries being England and France. Out of the 12, he worked 5 of them and was reported at the other seven. 8DHW continues to get out well but his report is low this month. 8CEI has a very low report, but he states that he still has no trouble working the west coast and cards from Europe are still coming in. 8PX has not been on the air for some time and has been very busy with the convention affairs. He recently purchased supplies for a sink, rectifier, though, and it looks like he will soon be with us again. 8BHJ has been getting out very nicely, having worked several sixes and sevens lately. The other night with only 9 watts input, he worked 4BL in Lakeland, Fla., who reported his sibs QSA. 8CVX has not been on the air for some time and has nothing to report. The "Jinx" station of the month is 8AKJ, whose power went off just after he successfully raised 24AK. His sibs reach out well, and were it not for this unfortunate jinx, he would have had another DX feather in his cap.

Dist. No. 10: 8AUD, a new station, has been doing fine work on voice. 8ADS and 8DSV have not been on the air much the last month. 8BYI was on about three nights and handled some traffic. 8BYI is using two 5's at present but expects to have more power soon. 8CCK is getting out FB and handles some traffic.

Dist. No. 11: 8CON is confined to his home with scarlet fever. 8DKI will be going on 80 meters soon.

Traffic: Dist. No. 9: 8AGO, 33; 8VE, 12; 8JQ, 59; 8DHW, 6; 8CEI, 6; 8BHJ, 10; 8AKJ, 4; 8CEO, 13; 8DGL, 13. Dist. No. 10: 8CCK, 22; 8BYI, 7. Dist. No. 11: 8DKI, 36.

SOUTHERN NEW JERSEY—

Traffic: 8ACQ, 14; 8BEI, 16; 8BWJ, 12; 8ZI, 17-2d; 8XAN, 2.

CENTRAL DIVISION

R. H. G. Mathews, Mgr.

INDIANA—Elkhart: 9YI, the star station, has made no changes, as his siver is poking out satis-

QST FOR MARCH, 1925

factorily. 9CXG is working both coasts with a "moonshine" tube. 9BSM and 9BQN are waiting for new broadcast licenses. 9APB is running a close second with 9BYL (Whoop 'em up, OM!) 9DHD blew his lone 50 watt. 9CEM is going good with the 5 "watter bottle". 9DDZ is still hitting 'em with 15 watts. Nappanee: 9APD says "bum report this month due to trying to get down on 80 meters." Fort Wayne: 9AFY has been reported married. Hi! 9AXE is better known as pre-war 8VA. 9IL is the station of the Keenan Hotel System. Albany: 9AUC was visited by 1P1 the other day. He says that traffic fell off for a few days after his rectifier "busted". His daylight DX for the month is C3WV, C2BN and C4AE on the high waves. 9BUJ has been trying to get the set down to 80 per. 9DRS has a 10 watt fone that has been heard lately in Massachusetts, Connecticut and Texas. He logged Belum P" on 1/27. Jonesboro: 9CAP, a new man to most of us, has been doing some very fine DX this fall. 9CTB says that there is much activity in Muncie with 9EJT, 9EJU, 9EG and 9FJP all working steady and all with a new LC transmitter. Marion: 9CLN has just been appointed C. M. 9AZX is still without an antenna.

Dist. No. 2: 9EFZ worked Australia, New Zealand, Great Britain and France on a 50 watt. 9DYT has been working both coasts on one 5 watt and A.C. on the plates. 9DHJ has junked the spark, so Indiana is sparkless now. 9AHE is working regularly on a 5 watt. He put a message into Portland, Ore., and got the answer back in three days. That beats sending it by the ox cart. 9BON has a 50 going on 150 meters. 9BMC is now working on 80 meters. 9CP is doing experiment work but not handling much traffic. 9EM is off the air studying for commercial. 9YB, Prof. Achats, has left, so there is no C.M. at Purdue now. 9BEJ is going good with a 50 watt and "S" tubes. 9FB lost his aerial but has put it up again and is hunting DX on 80 meters. 9CUB and 9BO blew their pet millimeter by trying to test their storage battery with it. They are off now. 9BPT sold his old transmitter to 9EFZ, who has been working the foreigners with it. 9BPT feels highly honored.

Dist. No. 3: Do not even hear any stations in this district any more. The A.D.M. will appreciate stations mailing their reports to him direct.

Dist. No. 4: 9EJI is getting out FB on the short wave bands. 9BVX is working the west coast every night on short waves. 9BJL is working on all kinds of DX with 10 watts on 80 meters. He has logged N. Z. 4AA, 2AC and 2AK. 9UT blew a 50 and was sick two weeks, but managed to handle a few. 9ADK is getting out on 80 meters. 9AUW is on the air again on 80 meters. 9PB is having trouble getting his outfit to perk. 9CYQ is getting out FB with his new 100 watt. 9CUR is rebuilding. 9AXH turned in a nice report. 9AUD has a 5'er perking and handled a good bunch of traffic. 9VC is working west coast on 80 meters. 9BIW has his fone going FB, but says conditions too bad for much traffic. 9CJA was reported in France. 9AQU managed to handle a few. 9DHR is on the air on 80 meters. 9BCC was home for the holidays, and worked all kinds of DX and handled most of the traffic for Indianapolis. 9AUP is doing fine work chasing interference for the gang. 9AWG turned in a nice report. 9CSG has an automatic CQ transmitter in operation. We call that the height of, we won't say what. 9ES has been working all districts with one 5 watt. 9DUC, list of fatalities looks like a message report. He blew five 5 watt and one 50 in Dec.

Dist. No. 5: 9PD is back on the air for the rest of the winter. 9ASV is going good on 50 watts. 9BDB has succeeded in getting 1000 miles on fone. 9DZX is in California. 9CCI is a new station in Rushville and is doing good work.

Traffic: 9AUC, 112; 9MM, 93; 9EHU, 64; 9BKJ, 51; 9BCC, 50; 9ES, 48; 9CTB, 46; 9EAQ, 40; 9EFZ, 40; 9AWG, 39; 9BYL, 37; 9AFY, 34; 9DYT, 34; 9ABP, 32; 9BJL, 31; 9DHJ, 25; 9DWW, 25; 9DLW, 23; 9AHE, 22; 9AUD, 22; 9AXH, 18; 9BVZ, 16; 9DUC, 15; 9ADK, 14; 9CSC, 12; 9BON, 12; 9AXE, 11; 9BGM, 10; 9CXG, 10; 9ASV, 10; 9BDB, 10; 9CP, 9; 9EJI, 9; 9CAP, 9; 9DRS, 9; 9DDZ, 9; 9CJA, 8; 9BIW, 8; 9CEM, 8; 9AGU, 8; 9IL, 7; 9QR, 7; 9CSG, 7; 9CCI, 6; 9CLN, 6; 9UT, 6; 9DRJ, 5; 9PD, 4; 9BK, 3; 9BYI, 1.

KENTUCKY—Things are going on well in the state with more stations in operation than ever before. 9HP has been the most consistent station for the past month. 9MN and 9ELL are doing good

work on 80 meters, from coast to coast. 9MN has 36; SGD, 35; 8AJZ, 33; 8ZE, 31; 8DBM, 30; 8AAM, 29; 8RY, 28; 8BIE, 26; 8DCP, 26; 8APP, 25; 8BQI, 24; 8AA, 23; 8BAE, 22. 8XAV, 20; 8ER, 18; 8AWM, 16; 8BGJ, 16; 8BDK, 15; 8ALW, 12; 8ATZ, 12; 8BVR, 12; 8BGF, 12.

ILLINOIS—Dist. No. 1: 9NQ is overhauling his station. 9DGA has dropped to 85 meters. 8BLZ has succeeded in operating a 250 watt tube on 80 meters. A B.C.L. set in the same room has but little QRM.

Dist. No. 2: 9DXL has his transmitter working a little better now, and has worked the west coast several times. 9ELR is working "DX" and handling traffic too. (A strange combination these days—A.D.M.) 9ELR wants schedules and can move traffic west. 9AHQ reports messages. 9BRX is on the low waves and handles no traffic. 9BGK says all stations in Ottawa are now active. 9DZR, of Joliet, has been appointed city manager. (9CA was talking with owner of WWAE one night and he said there were no amateurs in Joliet. Hi. (It's up to the C.M. to show the world that there are amateurs in Joliet and no stone wall around them either.—A.D.M.) 9BUK lost his aerial during the recent sleet storm. 9ARM says the traffic is very poor because of the local amateurs being scattered all over the various wave bands. Xmas vacation and battery trouble kept 9RQ off the air. 9CTF has been appointed an emergency station and will be supplied with an emergency set of plate batteries by the Burgess Battery Co.

OHIO—Dist. No. 1: 8FU is still trying to get his set to put out real juice on 75 meters, nothing less than 3 amps. 8ZY is out for the rest of the winter due to loss of poles. 8FU is busy at college—little accomplished except experimental work on low waves. 8BO is on again. 8BN sends in a real report. He is working on 150 meters and ready for R.R. emergency work. 8AA is connecting with the west coast with ease now, and has worked on English station. 8CNB has a new super and says it is FB. 8BQI is still doing good work. 8DHS has no antenna pole at his new QRA. 8DCB is not on very much, as he is changing to 80 meters. 8DFF is QEW college and is tendering his resignation as C.M.

Dist. No. 2: The message total has increased a little this month, more stations reporting traffic handled. 8ZE continues to work the west coast every time he is on. He gets reports from Australia and New Zealand. 8RY has exchanged signals with 66RY. He has had no luck working 65LF on schedule. 8BIE is on the air again and handling quite a bit of traffic. 8BCE is going strong on 83 meters working the west coast regularly.

Dist. No. 3: 8TT knocked off 58 messages this month and has been QSO A2CM. 8ACY and 8BKM have been off the air most of the month. 8BOQ sold his transmitter and is building a new one. 8BBW is using 15 watts on 80 meters now, and is working the west coast. He wins the "green flannel underwear" with 47 messages to his credit. 8DAE gets to the west coast ok. 8KC handled a good total. 8BWK is rebuilding for 40, 80 and 150 meters and has a new pole. The YL's are sure suffering on this account. Hi! 8ADA is putting Cleveland on the map, having worked England 4 times, Cuba, Porto Rico and Mexico. He is hearing so many Europeans that he doesn't know who to call first.

SDGP received a card from A3BG and Scotland. 8BK is open again on 80 meters. 8RJ is still on 170, but will be on 80 soon. 9DPN is breaking records with 17 ft. high antenna working on 40 meters, but says it only works in daylight. 8BVR woke up Xmas morning with a fine case of mumps, and was therefore QRW for two weeks. He put the receiving set at his bedside and 10 minutes afterward logged FBBZ and NPCI.

Dist. No. 4: 8AIB is on 80 meters and working FB. 8CWR's synk rectifier is knocking them cold. 8BGF is with us again and working hard for an O.R.S. 8CVA works the west coast. 8ALW is still on 200. 8APR is on every night—good work for a night watchman. 8BDK got a set of "S" tubes and is going strong on 50 watts. 8VN is installing a 250 watt. 8YX is now signing. 8XAV has been heard by Swedish 3MY, on 77 meters.

Dist. No. 5: We have two new O.R.S. this month. 8BAU and 8CBP, both of Columbus, and both turning in nice totals. 8BYN continues to work all American stations, but can't hear foreign stations, due to power leaks. 8BAU and 8CBP have both worked N. Z., and 8BAU also worked England and France. 8GZ is doing some fine work on 20 and 40 meters. He has been QSO Europe many times. (Keep up the good work, gang. I'll join you when I hear 'em—D.S.) 8DO is now back and is reaching out FB.

Dist. No. 6: Activity in district No. 6 is again picking up through the leadership of 8AJD. 8AK hands in a nice total and takes a box seat for Ohio this month. 8ATZ has blown his eleventh fiver and has a 50 watt perkling now. 8AAM hands in his first message report. 8AJD, on 75 meters, works west coast stations with one 5 watt.

Traffic: 8AK, 323; 8BYN, 176; 8GZ, 113; 8BN, 87; 8APR, 69; 8BAU, 62; 8TT, 58; 8ADA, 51; 8ANB, 47; 8BBW, 47; 8CBP, 42; 8DPN, 37; 8CCI,

Dist. No. 3: 9TW leads the list this month with the most messages. 9AFQ has arranged a schedule with 9CSW, Taylorville, at 12:30 noon each day for traffic that way. 9CXT reports that he has put up a set at the Court House for emergency work under the call 9ER, but had some trouble making it perk, as it was under a 65 foot copper dome, but was able to handle some newspaper stuff. 9CSW lost his pole in the sleet storm, but is going again now with a 60 foot drain pipe for a stick. 9MC has had hard luck in the form of two big fires. One burned the top off the house, and the fire company washed all the furniture out in the back yard, then a week later another big fire took the fine Ford garage owned by 9MC. Sleet wrecked his station and cut all power off, and they read by candles for two weeks. 9AHL also lost his pole in the big sleet storm, which was the worst ever experienced in the history of Illinois, according to aged residents. 9EFQ had sleet trouble also, but is going again. 9ATT lost a pole in the big sleet, and was out of power for three weeks, his counterpoise was also torn out by the roots. He is still out of commission and does not know just when he will get back.

Dist. No. 4: 9DCR went down on 80 meters and reports fine results. 9DHZ is moving some traffic on 150 meters but hasn't tried the shorter waves yet. 9BGC wants his school work to let up so he can erect a new CP. 9AP is doing good work on 80 meters but is bothered by B.C.L.'s. 9VV has a hard time keeping his tubes oscillating and is looking for a good circuit. 9DQU handled the usual run this month besides working Z2AC three times and Aust. 2YI once. Six reports were received from England. Maybe 9DQU will write a little story giving his DX formula. 9BHX is doing very good work, having received cards from some foreign stations. 9CLJ is doing excellent work with A.C. on the plates and worked every district on January 1st. 9CZL says traffic is plentiful on 150 now and has heard Z4AA. (9CCM says Z4AA's wave is just a hair below WGH.)

Dist. No. 5: 9DZG the C.M. of E. St. Louis is the only station in that city on the air. He is trying out 80 meters. 9AYB is using both the high and low waves and working on schedule. 9EBQ has his MG back and every thing going fine again. 9AQY is building a new shack for 80 meters. (How does this differ from the regular one, OM—A.D.M.) 9BLO, the D.S. is very QRW selling "Radios" and doesn't get much time for his "Wireless."

Dist. No. 6: 9DQR, after having had considerable trouble getting their transmitter tuned up, are now working both coasts with ease, using a "jug" and putting 5.5 amps in the antenna. 9CDY is still on 78 meters and reports the short waves FB. Experiments on 40 so far have not been very successful. 9DNP is going down to 75 meters. 9DVW, the D.S., is on regularly with 100 watts, reaching out fairly well. A Sync has been tried with very good results to begin with, as reports from stations worked are encouraging. 9ADZ sends in his first report as new O.R.S. 9CEC is moving his transmitter to another part of the house to cut down antenna losses. 9ALW shot his rectifier and an "S" tube that has been ordered for a month has

not yet shown up. 9AKU is the only active station in Freeport.

Dist. No. 7: It has just been announced by the Chicago Radio Traffic Assn. that the "Third National A.R.R.L. Convention" will be held in Chicago this year August 19, 20, 21, and 22. It is expected this will be the largest gathering of amateurs ever held in the world. 9AAW is on 81 meters with pure D. C. He will soon be lower. 9AIO blew his fifty about the middle of the month so is off the air for the present. 9BE, the B.C.L.'s Delight, works all day and pounds the key all night. 9AZ is back on the air again and is working on 82 meters. During the early hours of the morning many New Zealand and Australian amateurs have been logged. 9DHQ blew two fifties. A new receiving antenna of enameled wire, about half a mile long, is now in use. 9BRE finds that the less you have in a set the better it works. (Probably less-loses—D.S.) (Check, check;—D.M.) 9APK blew his bottle after two years use. 9EEG also blew his five watter so bought a fifty. (A 100% optimist—A.D.M.) 9AOR, a new O.R.S., is on the job with 100 watts, also building 10 watt, 80 meter set and has three ops. (FB,—D.M.)*

Traffic: 9CZL, 185; 9DXL, 86; 9DQU, 79; 9ELR, 70. 9AIO, 55; 9DHQ, 50; 9CLJ, 45; 9AAW, 42; 9BE, 40; 9DVW, 35; 9BHX, 34; 9AHQ, 33; 9BRE, 24; 9ADZ, 23. 9TW, 23; 9CDY, 22; 9DQR, 21; 9EBQ, 20; 9AFB, 18; 9BRX, 17; 9MC, 16; 9AWQ, 16; 9DWX, 15; 9AYB, 14; 9DHZ, 14; 9BGK, 13; 9DZR, 12; 9BUK, 12; 9ZAT, 12; 9DZG, 11; 9CXT, 11; 9APK, 9; 9EEG, 9; 9BDA, 8. 9CEC, 8; 9DGA, 8; 9CSW, 9; 9BIZ, 7; 9ARM, 6; 9AHJ, 6; 9RQ, 3; 9EFQ, 2; 9ALW, 2. 9ATT, 1.

MICHIGAN—Dist. No. 1: This district has some good traffic hustlers this month with 8DGT taking the lead. D. S. Fallain says the R. O. W. H. Supreme Council at Flint is getting along fine, and he has just ordered 1,000 new buttons for prospective members. 8VT, 8ZZ, 8WA and 8DOO all have been heard in Europe.

Dist. No. 2: 9CED bats over 100 this month. 8BNC is another 100 hitter. 8CED has been heard in Europe several times on 80 meters.

Dist. No. 3: A district meeting was held in Grand Rapids, Michigan, in December, at which a good time was enjoyed by all present. The purpose of the meeting was to get the Grand Rapids hams in a more organized form and get them to operate their stations more regularly. All of the active stations were visited in the course of the evening. A toy Bull was presented to 8CPY, the winner of the Liar's contest. 8CZZ was home over the holidays from Chicago and did a lot of traffic handling. (FB, OM—D.S.) 8AUB is one station in Grand Rapids that is doing the real of 8JG. Right away his traffic has jumped. (Fine stuff, OM—D.S.) 8AQA also got a few nights while home over the holidays and handled quite a lot of traffic. 8DDT hands in a nice fat report this month. 8DOK has had lots of hard luck getting tubes to stand the gaff. 8AAL grabs second place in traffic handlers list this month. 8DFS is a new station about six miles from Kazoo and soon will be QRV to bag some good DX records. 8DSE is doing some of the best DX work in the district. Big msg. total, too. 8BDY and 8DKF each handled one msg.—better than none at all. 8CZY is QRV all traffic for Ludington. 8CPY was in operation quite a lot during the past month and has been able to work every district in 52 minutes. 8CPY is on every A.M. from 5:30 to 7:00 and most every P.M. in the early hours. QRH is 77½ meters. On January 17th, the first A.R.R.L. rabbit hunt ever held, was given by D. S. Wilson of Kalamazoo. D. M. Matty and his O.W. attended and a gang of about 50 participated. No rabbits were destroyed but a great time was had by all during the day, followed by a feed at the Park-American Hotel and an initiation into the mysteries of REKOP.

Dist. No. 4: Reports have been received from 9EFP, 9CWI and 9AEN.

Traffic: 8CPY, 72; 8CZZ, 34; 8AUB, 15; 8JG, 15; 8BOK, 7; 8DDT, 32; 8AAL, 30; 8AQA, 10; 8DFS, 1; 8BDY, 1; 8DKF, 1; 8DSE, 32; 8CED, 115; 8DNC, 107; 8DGT, 72; 8DOO, 66; 8DCW, 54; 8BTF, 41; 8DBO, 32; 8DOK, 30; 8CAP, 26; 8ACU, 19; 8ZZ, 16; 8ZH, 14; 8ZF, 13; 8WA, 11; 8CWL, 10; 8BD, 10; 8CCW, 9; 8AMS, 6; 8CEH, 4; 8CLG, 4; 8ZI, 3; 8BUL, 2.

WISCONSIN—Dist. No. 1: 9CMP, not much help at station 9DTK-YI, QRM heavy. 9AFZ is just taking over his duties as D.S. 9ATO is rebuilding his receiver and transmitter, a la low-loss. (Watch out,

gang, he's after the Flewelling Cup!) 9DB is getting out good with an amplifier tube. He is also rebuilding and will get in on the Flewelling Cup contest. 9BMV pledges his support and QRV messages from hotels and hospitals. 9BKR is patiently awaiting the return of his 50 watter. 9DTK, new C.M. for Milwaukee, leads the district in traffic and is looking for competition. 9ELV is still pushing a lone fiver on 173 meters. 9CII has his emergency transmitter just about ready. 9NY works the west coast consistently with two 5 watters and Edison "B" battery plate supply. 9CVI has been trying capacity coupling with mediocre results, but has fallen back to inductive coupling on 80 meters. 9HW, very QRW. (Wonder is it nite jr. op. QRM?—C.M.) 9BTK is rebuilding, ultra low-loss throughout. 9BEK will be QRV for traffic shortly with a 50 watter. 9ATB just completed his radio room in the attic. 9VD is organizing his emergency stations in Wisconsin and holds tests every Saturday night and Sunday morning.

Dist. No. 2: 9BIB is using a 50 watter now, also 9AZR. 9AJW is reaching out on fone but is having trouble with B.C.L.'s. 9EK has been doing considerable work on 20 meters. It seems that with nightfall the signals fade out on 20 meters, showing this wave works best in daylight as yet. Mr. Burgess, who is backing 9EK, thinks the short wave stuff is so good that he is going to install a 20 meter station down in Florida. They have called Don Mix of WNP fame to build the set and operate it. Ever since Mix visited Madison the gang at Madison have been turning out to every meeting and great interest is being shown. 9DUK, a newcomer, is at Deerfield. He has already applied for an O.R.S. He tops the district this month. Ex-9ADI will soon have two C.W. sets going strong on the air. 9DDQ's featherweight mast took a tumble and wrapped itself around his garage. Hi! 9DWP, ex-9GP, has a 50 watter ready for operation. 9CWZ reports going down to 80 meters and traffic seems to be improved down there. 9BMF attended the Racine gathering and picked up some dope on operation on the short waves. Also visited Milwaukee amateurs. 9OM says activity is sure on the slump in his locality. He says he is breaking a B.C.L. into the traffic game. ('Atta boy!) 9EAR blew a fifty trying the short wave stuff and is now back on 160 on one fifty watter with two for reserve. 9AZA needs another op. as K.C. does not get time to do much operating. Lots of activity around here, not including radio. Hi!

Dist. No. 3: 9CIU moved most traffic in the district. 9BVA gets all over the U.S. on 80 meters but no European report yet. 9BYJ says, "same old story, school QRM." 9AEU's emergency batteries, donated by Burgess Battery Co. are working fine. 9ADP is knocking 'em dead on 80 meters for change. 9EMD, everything going wrong here. He worked a bunch of stations in spare time but not much traffic.

Dist. No. 4: 9ALI brought in a good total of 160 messages while working home during the holiday vacation. He is still on the upper waves and has not had time to get down to the real DX section. 9AZN finally came down to 76 meters, working on the third harmonic with excellent results. Practical daylight range increased to the Atlantic coast and all districts were worked in five hours early in the evening. The most pleasing result was that communication was established at all times with the Milwaukee stations so that traffic cross the state is practical. Daily schedule is maintained between this station and 9DTK. These stations have only about 10 minutes to clear traffic at noon so there are wild times. 9ZY has been going strong during the last half of the month with 9AQD operating and also 9BFI from Minneapolis. 9ZY received one QSL card from England and now has three from Australia. 9AKY has also been converted to the short waves and handles the morning traffic here. He claims that the fivers do about as well as the 50 watters and those that he has worked who sound like a jug are using 201A's. Hi! 9EIL handled 25 messages. 9PJ handled 14 messages, mostly with fone. 9CFX reports 6 messages and promises to do better next month. 9DST reports the same number. 9BLF and 9BSO report nix, the latter saying that his tube absolutely refuses to perk.

Traffic: 9ALI, 160; 9DTK, 156; 9OUJ, 96; 9AZN, 93; 9EK, 75; 9ZY, 71; 9CWZ, 49; 9EAR, 48; 9AZR, 32; 9CIU, 32; 9BVS, 31; 9AFZ, 28; 9BYJ, 28; 9ALA, 27; 9AEU, 26; 9AKY, 26; 9ADP, 25; 9CCF, 25; 9EIL, 25; 9ATO, 20; 9AGD, 20; 9DCP, 17; 9PJ, 14; 9DB, 11; 9BMV, 11; 9BMF, 9; 9EBV, 9; 9BIB, 9; 9VD, 8; 9BKR, 6; 9CFX, 6; 9DST, 6; 9CII, 5; 9OM, 5. 9NY, 4; 9BMY, 4; 9DZV, 1; 9CVI, 1.

DAKOTA DIVISION D. C. Wallace, Mgr.

MINNESOTA—Shouts of joy are heard at the return of the Brass Founders' League! Please notice that O.R.S. must report every month—no exceptions. A wholesale cancellation of O.R.S. is starting this month for the non-reporters.

Dist. No. 1: 9BAV's pet 50 went west getting started on the 75 meter band. (His three page thesis on this westward trip should be copyrighted. Hi!) 9CDV is reported from G2CC and IHS, and is high man in the state for traffic this month. (FB!) 9CMS is doing nice work and expects to install 8 tubes. 9AYQ mourns the loss of a five watt, but keeps right on with his good work. 9EGF is having hard luck getting out with ten watts. 9DXT has been moving but is on again. 9ADF, 9AND and 9AEI are the only Duluth stations reporting. 9AEI has a fine start on his new job as O.M. 9EGU is going good on 77.5 and 155 meters. He is ready for quick QSY to any band. 9BMR is going again on the low waves. 9EGU and 9BMR have been appointed "B" bat stations in the RR Emergency System.

Traffic: 9CDV, 166; 9BMR, 61; 9EGU, 60; 9AYQ, 38; 9AEI, 23; 9CMS, 20; 9BAV, 9; 9AND, 8; 9ADF, 6; 9DXT, 6.

Dist. No. 2: 9AXS still takes the lead for consistent DX. He has worked Z2AC, Z4AG, Z4AA, A3BD, A2YG, and A2YI across the Pacific with 16 watts input on 80 meters, and is also reported from Europe. (FB!) 9AIR has increased his DX with increased voltage supply. 9DDP claims the honor of being the first Dakota division amateur to exchange with N.Z. He did it in November with 5 watts. 9SW is getting good results using spark coils for plate supply. 9CAJ and 9CYX have had a little trouble with BCL's but found the source of trouble in a leaky power line. 9DMA has been back on the air. 9BFU blew a fiver but is back with replacement. 9BNF can work anyone he hears with five watts on 80 meters. 9DCH is the only Waseca station working, but 9ALD expects to be on soon. Good! 9CPO has rebuilt on low loss lines and is experimenting with the 20 and 5 meter bands. 9EGG continues to work all over the country on five watts. This district claims the most and best five watters in the country.

Traffic: 9AXS, 58; 9CAJ, 30; 9DMA, 30; 9COF, 28; 9DCH, 26; 9CYX, 25; 9EFD, 20; 9DQM, 15; 9MP, 14; 9EBC, 14; 9BFU, 13; 9CPO, 11; 9SW, 8; 9AWM, 4; 9DDP, 3; 9EGG, 3; 9MB, 2; 9BTZ, 2.

Dist. No. 3: 9ZT is the star station working numerous Z and foreign stations. 21 owls have been organized, including Z2AC under his supervision. 9ZT has worked 10 countries and has reports from 20. 9ABK leads the district for traffic and does good DX. 9DAW worked Porto Rico. 9XI has a new aerial and is ready for any wave. They are doing fine work on the 20 and 40 meter bands. 9BIS has worked Z4AK and Porto Rico on 5 watt. (Very FB.) 9BFI has worked Mexico and has numerous reports from Europe. 9CIP has worked N.Z. 9BRY got an emergency death msg. for 6BHW and got an immediate answer. (Very FB. O.M.) 9DPX continues to work out over the country with 5 watts. 9CFI worked Z2AC.

Traffic: 9ABK, 71; 9BPY, 50; 9DGE, 50; 9DQH, 40; 9XI, 38; 9SE, 38; 9BFI, 35; 9ZT, 33; 9CCX, 25; 9BMY, 24; 9BNK, 23; 9DYZ, 20; 9DAW, 19; 9CIP, 15; 9BIS, 9; 9DEV, 10; 9BLY, 1; 9CPM, 52; 9PH, 9.

NORTH DAKOTA—Unfortunately, the A.D.M. for North Dakota has found it necessary to resign on account of lack of time. He is at present taking over his father's business, and may be with us at some time in the future in an active way once more. We regret very much to lose Bert Wick as A.D.M. at present, but hope to hear his signals from 9AEJ frequently. A new election is being conducted at present for the new A.D.M.

9EE, Ellendale, has a transmitter going successfully on 80 meters. 9EFN and 9DBR are very active.

Traffic: 9DBR, 31; 9BZE, 18; 9AFM, 4.

SOUTH DAKOTA—Hats off to 9DBZ, fellows! He works Australia with one lone fiver and with a low input at that. Can anyone beat it or even tie it? The regulations are going to be enforced a little more strictly in the future, gang, so watch your step.

Those reports mean something, so let's get them in and on time.

Dist. No. 1: Are you fellows going to let your D.S. be the sole A.R.R.L. representative in your district? Looks like it! 9CKT reports DX FB on the 150 meter band and rattles the cans everywhere, although hampered somewhat by school work. Some rumors are heard of a new station in Sioux Falls, but it has not materialized yet. 9CKT, 13.

Dist. No. 2: 9AGL works the west coast at nine thirty in the morning with 10 watts, and says he has his key click conquered. Get his dope on a real rectifier and filter. 9CJS wants to move back to his old stand, but the OW says, N.D. Says the old place may be ok for DX but "debut" for anything else. 9ABY blew his fifty, but is perking good on a fiver and ready for traffic. 9CGA still out of commission, but will be with us again in the near future. 9DBZ worked Australia for twenty minutes with his fiver and does most of Huron's DX work. 9DID has his new generator and is back on the job.

Dist. No. 3: 9BDW has worked both New Zealand and Australia. QSR's a message to Z2AC direct, and has also been reported heard in England. Guess we can be proud of him too. 9CBF has been rebuilding, so no traffic.

Traffic: 9CKT, 13; 9AGL, 38; 9ABY, 24; 9DBZ, 34; 9CJS, 26; 9TI, 8; 9BDW, 26; 9CKD, 18.

HUDSON DIVISION E. M. Glaser, Mgr.

2AQR and 2WR have been appointed official broadcasting station. New O.R.S. are 2CVL, 2BQC, 2BQU, 2CTH, 2AGM, 2SZ, 2BW, 2CSL and 2ARB.

At the Second District-Hudson Division Convention held in N.Y.C. the first week in March, there will be a Hudson Division Traffic Meeting. All officials and owners of O.R.S. are urged to be present. The meeting will take place on Saturday afternoon, March 7th. Traffic Manager Schnell and Division Manager Glaser will speak.

O.R.S. are again warned that they are signing their death warrant whenever they are on an illegal wave or fail to report. There are plenty doing both. 2ADH has succeeded 2UA as A.D.P.M., and as D.S. of New York dist. No. 2.

Kastenmayer's report is the best this month. (FB, GK!) Wester's report has improved steadily. Soon everything will be going full blast in Jersey. The get-together recently held there under the auspices of the Executive Radio Council was a huge success. These meetings tend to keep the amateurs closer together and should be encouraged. Several stations are operating on 40 meters with excellent results. Come on, gang, don't be backward. Don't let the other districts get ahead of us. Let's have the greatest attendance on 40.

NEW YORK CITY—2CVL is a new O.R.S. and is going to help out the Bronx gang. 2AAI is QRW making B.C.L. sets. 2CWR is going full force with the set perking daily. We heard the O.W. was very ill. (Hope she recovers soon, Fred.) 2CYX, C.M., was the busiest station this month as usual. 2CEI has been ill.

BROOKLYN—Brooklyn is low in traffic but high in activity. 2CHY, C.M., is technical "ED" of a local paper and has his hands full. He hasn't been on much. 2WZ is trying hard to improve that unreadable first of his. Keep it up, Johnny, you'll get there! 2CTY, on 75 with pure D.C., has been heard in several foreign countries. 2EQ and 2ABR are still up on 150. 2WC has a new 250 which he burns away under normal on 40 and 75. (That's the way to burn 'em, Mac—D.M.) 2AAY has been busy at school; hence, not much doing in radio. 2PE has at last reached the west coast. He was using only about 100 watts and a small, low antenna, too. 2BRB was reported in India, 350 miles northeast Calcutta, very readable and steady. Cards are still coming in from Australia and vicinity. Europe is local. Hi! 2CHK has heard a few Australasians and expects to be QSO soon. He is busy keeping tabs on his gang. 2BNL has at last dropped to 80. 2KR reports little traffic available. 2LA has trouble with an unsteady note. The mast at 2LD came down but he is going again. 2CSL is getting to the west coast often. 2CNK managed to get his pair of 250's down on 80. Some QRM, we'll say. 2ABT worked QJS on two fivers. Several of the gang are losing interest. Come on, fellows, wake up! 2XNA is going during college hours and occasionally at night.

E. M. Glaser, D.M., is now president of the C.C.N.Y. Radio Club and 2BOP is Chief op.

2BSL and 2AVE are on once in a while. Where is the rest of the bunch?

The Staten Island gang are coming up every month. 2CEP and 8BQU are the mainstays for activity. 2CIS is on the air. 2NB and 2CKT are experimenting on 5 meters and vicinity. 2ND gets on whenever he has a chance. The station would make a good O.R.S. if on the air more often.

Traffic: 2AAI, 6; 2CVL, 10; 2CWR, 4; 2CYX, 41; 2CEL, 12; 2BRB, 41; d2: 2WZ, 40-d 10; 2CTY, 22-d4; 2EQ, 12; 2ABR, 7-d1; 2WC, 16; 2AAY, 8-d1; 2CHY, 2-d2; 2PE, 2; 2BNL, 12; 2CHK, 48; 2LA, 10; 2KL, 37; 2LD, 12; 2CSL, 11; 2AQL, 1; 2CZR, 26; 2BSL, 2; 2AVE, 3; 2BQU, 42; 2CEP, 33; 2ND, 8.

EASTERN NEW YORK—Dist. No. 1: 2KX recently went down to 82 meters and found to his delight that the reports of the wonderful DX available on that wave were not exaggerated. He worked all districts, England, and France in one week using four 5 watters. 2AV had the hard luck to blow his 50, but he stuck in a 201A and carried on, working 1500 miles. 2BPB is QRW at College. 2CXB is off the air for the present but hopes to be on very soon.

Dist. No. 3: This little district, although it boasts only a few active O.R.S., certainly helps to boost the traffic total. 2ANM and 2CDH both are doing very good work, both in traffic and DX and we sure could stand a few more stations like them in some of our other districts. 2CDH delivered 17 msgs either by mail or personally, and 2ANM delivered 2 by mail.

Dist. No. 4: One of the star districts, Taber always sends in a REAL report. So some of the other D.S.'s can see what a REAL report looks like. 2AQR has his 50 watter working great now and handled a nice big bunch of traffic this month. Also he is doing some fine DX. 2CYM is still on the job and is keeping things going down in that corner of the district. 2CKG is back with us again after a short silence with more pep than ever with his 6 watter. Although he was on the air only fifteen days of this month he sent in a fine report. Also he says he is doing the best DX he has ever done. 2CNP is back on the air again with a nice punch and a DC note. He says he is stepping out fine and also is QRV for any traffic for all parts of the country. He handed in a nice report for the month. We sure are glad to hear him again. The 50 watter at 2AGQ worked great for about three weeks and then went bad. Hi! Even so, they received a report on our sigs from Scotland and 6PZ. 2AQR and 2CKG of Newburgh pulled off a fine stunt with 2AHK of Poughkeepsie this month. They sent, play by play, a description of the basketball game between Poughkeepsie High School and Newburgh High School at Newburgh, to 2AHK in Poughkeepsie who sent it to the Poughkeepsie Y.M.C.A., where it was given to the Poughkeepsie rooters who could not attend the game at Newburgh. They were very successful and the Poughkeepsie fans enjoyed it very much and are very grateful to these hams. They deserve much credit for carrying out this novel stunt. They hope to be able to do this again in the near future when the return game is to be played. 2AHK of Poughkeepsie is a new station and is doing fine work with 10 watts. Also he handles quite a bit of traffic. 2CHZ says he is very QRW so cannot be on as much as usual. Also he says the traffic is very scarce over that way. Hi! 2AQR, 2CKG, 2CHP and 2CHZ took an active part in the eclipse tests by transmitting the dope given them by the A.R.R.L. headquarters. They were the only 2's that transmitted it.

Dist. No. 5: 2AWF is getting Albany going fine. There are two O.R.S. and more going. He is always doing fine DX and is QRV for some traffic which he says is almost nil there. 2BSB reports no traffic. He blew two 5 watters so was QRT for a while. However he is back again strong at present. 2PV beat 2BSB by blowing 3 "fivers." Hi! He is kicking out in fine style with his 5 watt tube. 2BXW, an old reliable, reports not much doing due to a bum "S" tube. Better luck next time. Schenectady: 2BY has worked every European country that is getting across. He works S.A., Mexico and other places on this side of the pond. Foreign traffic is a specialty here. 2GK has his pure DC going once more. He did wonderful DX with his AC but is sure steppin' now. He also works Europe, S. A., etc.

2ACS with his old 50, dropped to 78 meters. He worked 35 west coast stations and 4 Europeans in one month. He is on every day and gets a good deal of traffic as a result. 2CPA is QSO all districts. Porto Rico and Mexico practically every morning. He is anxious to work "across" as he is being heard there often.

Dist. No. 2: Yonkers, only, reported by 2ADD, C. M. of Yonkers. 2AAN says that he is working the coast easily on 5 watts and 80 meters. 2APY is still the wonder station of the town. Same power and wave as 2AAN but he is working six European countries regularly! He didn't handle many msgs but the one he did, made up for it. He heard WJS in Brazil trying to give it to an eight and copied it and delivered it immediately by fone. FB. That was his only msg. 2CIL is too busy experimenting on low waves to handle much traffic. He is now working on 40. Says it's best yet. 2AHB is a very active station and is regularly handling more traffic than some of the O.R.S. in this district. He is going to get an O.R.S. Just as quickly as the certificate can be filled out and mailed to him.

Traffic: Dist. No. 1: 2AV, 34; 2KX, 8; 2BPB, 4; Dist. No. 2 (Yonkers only): 2AAN, 8; 2APY, 1; 2AHB, 28; Dist. No. 3: 2CDH, 91; 2ANM, 26; Dist. No. 4: 2CYM, 28; 2AGQ, 109; 2AQR, 102; 2CKG, 41; 2CNP, 23; Dist. No. 5: 2AWF, 10; 2PV, 3; 2BXW, 6; 2ACS, 81; 2CPA, 43; 2GK, 5; 2BY, 82.

NORTHERN NEW JERSEY—All District Superintendents are to be commended for the good work of getting most of all of the O.R.S. to report.

Dist. No. 1: This district leads in N. J. for the largest number of messages handled for the past four months. 2CJX again leads with the best traffic report for the month which is very FB. 2AT has QST'd to 80 meters and reports that everything is set for the best DX year yet. The only rock crusher remaining in operation is that of 2BMR and we hope that this one goes where all other sparks have gone. 2AJA is still QRW college which accounts for his absence from the air. 2ADU received his first report from the west coast and still feels the effect of his best DX. The reconstructing of a transmitter has kept 2ATE off the air for a while but he promises that more noise will be made now than ever. 2AJF is responsible for this live district and complete report which is FB. 2AFP, and a few hams from Paterson, installed a transmitter on a mountain and established communication with England, France, and Belgium.

Dist. No. 2: 2WR has installed a 250 watter but will return to the 50 watter which gave better results. Hi! Particularly good DX has been done this month at 2AXF who worked QJS in Brazil several times, handling very important msgs. for the U.S.A. He was also QSO England, Bermuda and Porto Rico. 2CRP, the C.M. of Bayonne, is very active these days and is handling considerable traffic. 2CDB, the D.S., requests that the O.R.S. in his district cooperate and mail their reports in to him on the 17th of each month. (Come on, fellows, let's work together—A.D.M.) 2BW complained that he hasn't handled a sensible message in ages and we fully agree with him. 2AFJ is the only active station in Montclair. AFJ is rebuilding and increasing power to 50 watts. 2AHO and 2ZB are responsible for the successful ham get-together held in Newark on January 24, at the Hotel St. Francis. FB. 2CMK has departed from the amateur field just like burnt-out fifty watter—the reason is YL's. 2ABZ has returned to the air and it sounds good to hear from an old timer again.

Dist. No. 3: 2CQZ is conducting experiments on 40 meters with very little success. 2AMB, the long lost, advises a consolidation with 2LV with a super-station. 2ACO is heard regularly working good DX. 2AZY has been appointed C.M. of New Brunswick. It never fails but that when your station is working best, a tube must burn out. Ask 2BGO. 2QS, with only "5 watts" is receiving reports from England most every week. 2CRW is still bothered with a power leak which has kept his station off the air for several months.

Dist. No. 4: On the sick list of this district is 2CXY and 2BUY, and we hope for their speedy recovery. 2AUH has returned from Cuba and can be heard nightly now on 160 meters. 2CGK is still busy with a five watter in Meissner circuit and is stepping out in fine shape. Probably the best DX station in this district is 2BGI, who has worked all corners of Europe. 2FC, the D.S., thanks all of the

O.R.S. for their good cooperation. In regard to DX, the West coast and Porto Rico have been worked and reports received from Europe. 2CPD reports working eights and nines on 160 meters in the day time, which is very FB.

Traffic: 2ADU, 15; 2ATE, 5; 2AJF, 10; 2CJX, 174; 2AJA, 28; 2AFP, 17; 2AT, 27; 2CTQ, 91; 2BMR, 16; 2WR, 31; 2AXF, 19; 2CRP, 18; 2BXD, 30; 2BW, 47; 2AFJ, 9; 2CDR, 11; 2ACO, 20; 2AZY, 10; 2BGO, 18; 2CQZ, 10; 2CRW, 6; 2QS, 14; 2BGI, 20; 2CPD, 29; 2AUH, 6; 2FC, 16; 2BZJ.

MIDWEST DIVISION

P. H. Quinby, Mgr.

NEBRASKA—Dist. No. 1: Traffic has been steadily moving and increasing the past month due to the fact that the majority of stations are active and on the air consistently. Most stations are experimenting with the low waves, so that not much is as yet being handled on the low bands. There are a large number of Omaha stations active, and consequently traffic is moving through smoothly. 9NL is back on the air after installing a new antenna. 9EGA is a new O.R.S. 9AWS is evidently the most consistent station in this district as shown by his message report. 9CGS has been on 80 meters and says they are sure FB, but has experienced some trouble so is off temporarily. 9CJT is back again with 100 watts on 75 meters and going fine. Another new O.R.S. is 9DUO. In spite of his low power he has handled a large number of messages. 9DXY is heard occasionally on low waves and has some kick.

Dist. No. 2: Traffic is moving smoothly through this district although there isn't as many active stations as usual. Very little activity in Lincoln except during the week-ends, at which time traffic moves in good shape. "DX Hounds" put the "can" on traffic on the low waves according to stations working in those bands. 9AFR expects to have a 50 watt on 80 meters. 9EAK reports good DX, but little traffic. 9AKS is on with 10 watts and turns in a fine traffic report.

Traffic: 9AWS, 182; 9DUO, 98; 9CGS, 41; 9NL, 13; 9EGA, 2; 9BYG, 4; 9AKS, 97; 9AHI, 56; 9BLK, 34; 9DAC, 31; 9DQE, 91; 9DJP, 5; 9EEO, 10; 9BOQ, 17; 9EHW, 9; 9EAK, 16; 9DXY, 18.

KANSAS—The DX and traffic season is at its best. Traffic is picking up along with DX records. Surely we are making amateur history to be proud of.

9CEA with a 50 watt on 80 meters has worked New Zealand and has been reported in England. All the Lyons hams are now on the lower waves. 9AFP, after blowing a dozen or so five watters, now has a Telefunken 30 watt. All the Wichita hams are in love with it. Kansas will have more of these tubes soon. Already 9BIO is getting one, although with a blushing five watt he worked all the U.S. districts. Since 9BRD got the MG his fone has been the bane of the Newton BCL's. 9BLB does good work on a lone fiver. 9DHW persists in blowing his generator. 9CCS, with his SAME old WE 50, is heard chewing the rag with a 1 or 6. 9CMZ with an amp. tube sweating on 80 meters, hooked up with a 7. He has heard Danish and British amateurs. 9DLM and 9BXG keep the air blue. 9ACQ is a new O.R.S. and is on 80 meters doing some dandy work. The Lawrence gang is QRW as usual. 9DNG lost a 50 but is on again. He will get a larger tube. 9EHT and 9AOD are working each other on 5 and 20 meters. 9EHT still hears A. and NZ. hams. 9AEY lost a 50 but is still running on another. A2BB reports 9AEY the loudest yank in Aust. 9QW has been experimenting with arials, inductances and divers parts. 9CVL, with his fiver, hooked up with MBX. 9CFI has been QSLed by G6TD. Q2MK. Chile 9TC, ZZAC and has worked A2YL. He gets 6 amps ant current on 80. (No wonder!) 9CFI heard ASGZ working 6ARX, both on 20 meters.

Traffic: 9BVN, 183; 9BXG, 85; 9AEY, 52; 9CVL, 24; 9DLM, 30; 9CFI, 102; 9AOD, 12; 9EHT, 20; 9DNG, 17; 9ACQ, 10; 9QW, 14; 9CCS, 20; 9BIO, 104; 9BRD, 87; 9AFP, 29; 9CEA, 43; 9HN, 8.

IOWA: Dist. No. 1, surpasses No. 2 in handling traffic this month, which goes to show that this district is improving. 9HK is working on 41 meters, and works Mexico with ease. 9BCD is QSO on 80 meters. 9AXD is out of commission, but is rebuilding the entire set. 9CS reports a 50 watt under construction. 9BCX was on 77 meters during the Holidays, and will be on at Iowas with 9DSL and 9CKS. 9AVJ reports that he works northwest in

fine shape. He has a new antenna and counterpoise system. His operating hours are 12-1 noon, 6-7 P.M. and 4 to 6 A.M. He would like a schedule in the early morning. 9CAV has been overhauling his transmitter and is building a new receiver. He has been transmitting with the British A Craft hookup, using 2 English 5 watt valves. 9BHN has made application for the cellar wave length. D.S. Beck reports not much traffic. 9CZO, using 1 201A, has worked both coasts and was also QSO with 5CN at the noon hour. 9BEW is doing good work and his low msg. total is due to rectifier trouble. 9CZC is another man doing good QSR work. 9DMS is down on 80 meters now and claims it is FB for traffic. He is having some trouble with B.C.L.'s. 9BTX threw together a set during the holidays and handled the most msgs of any one in the first district. (FB!) 9BPF is doing excellent work on 80 meters. 9DIP works the east coast ok. C.M., 9BRS, will be on again in February with 5 watts. 9APM shot a 50 while sending through news to St. Paul when the wires were down. FB! 9ON and 9BWA at Iowa City are opening up a station.

9EFH bet 9CLQ a pair of green socks that he could work Australia or New Zealand before 9CLQ did. Well, 9CLQ worked Melbourne, Aust. thus winning the charming ankle warmers. 9EFH, then bet 9CLQ that he could total up a bigger mileage of "foreign worked" than 9CLQ could. Each QSO had to be over 2500 miles and the contest to last one month. 9EFH piled up 30,500 miles and won. 9EFH is the first Iowa station to work across the Atlantic. FB!

Traffic: 9AVJ, 169; 9BCX, 22; 9AMU, 40; 9CHN, 10; 9OJA, 12; 9AXD, 13; 9HK, 75; 9BCD, 76; 9BWC, 14; 9BTX, 42; 9BEW, 35; 9CZC, 38; 9CZO, 31; 9DMS, 38; 9EFH, 18; 9BPF, 46; 9DIP, 47; 9APM, 6; 9CS, 18.

MISSOURI—Traffic has had the customary boost this month due to the numerous messages sent during holidays, likewise there were more stations on during this time to handle them.

Dist. No. 1: Traffic has been on the jump this month and some real messages were handled due to the heavy sleet storm which crippled the wires. Outside this, much League traffic has been handled, too. Four stations did emergency work during this time: 9DMJ handled 850 words of associated press and 44 msgs of Wabash traffic; 9EKY handled many messages for the A.T. T.; 9DXN and 9AAU, along with 9PW handled P.R.R. emergency. 9ELY, a new station, is handling traffic and is getting out nicely. He used four 5 watters but expects to install a 50 soon. 9DMJ, beside handling lots of traffic, also worked English, New Zealand and Australian stations. 9NU has had his O.R.S. cancelled. 9DWK is now on very little on account of rushing business. 9BSH is on the air with a couple of fifties at present.

Traffic: 9DMJ, 243; 9AAU, 35; 9DLB, 22; 9DXN, 15; 9PW, 11; 9BSH, 11; 9ELY, 10; 9ACI, 10; 9BHI, 7; 9BRU, 6; 9DWK, 4.

Dist. No. 2: 9BVK wins the honors for prompt reporting. 9DIX is doing considerable traffic work on low waves, reaching both coasts. 9AOB is building a 250 watt M.O. set for 80 meter work, with schedules in prospect with 9DWK and 9DBH. 9DZO sold out but may assist 9DAE in building a new set to operate in Warrensburg, leaving the Amrad coil set out on the farm. 9AOU has moved to Holden and has a 9 license but we have not his QRA. A radio club has been organized in Sedalia. Checker games are being conducted by radio between 9DVJ and 9EAO. 9DZL is back home in Ravenswood and overhauling his set. Southern Missouri is continuing to be active. 9CRM is doing some very good DX after many disappointing experiences in the past. 9EGS is logged often in K.C. but expects to move shortly. 9BUE (KEPW) does considerable QSR on fone, but explains this is due to an injury to his hand which makes key work very difficult for him. Numerous messages are passed from his station via 9COP (Mulberry, Kana. 9BHA (Ft. Scott) 9BSP-UA (Olathe) and then to K.C. We hope ex-5AUO at Holden will help an all-Missouri route to re-enforce this. Traffic from K.C. to this section now is obliged to make the jump in only one relay and ND in daylight, except via the Kansas stations named. In K.C. 9SS-ZD has been having his troubles with a WE 250. Gets only 6 amps on 80 meters but gets out, though locally he is QRZ. 9ACK is stuck with a pole half-way up, and needs a lift. 9ADR handled

a wad of msgs this month. 9RR had a mix-up with a vicious dog and is laid up at this writing, but able to get about and pound brass. A new aerial made its appearance at his ranch (?) and DX is better. 9BKK also has a new aerial. 9ACX operated at 9ZD, 9BKK and 9RR during the tie-up of his own station. He says he's glad the eclipse comes only once in 200 years. 9ZD is hunting the induction QRM bug in K.C. Recently all the sub-stations of the light company and the street railway company were shut down one by one in an attempt to locate the trouble, but nothing was observed.

Traffic: 9DIX, 7; 9AYK, 15; 9BYK, 100; 9DOO, 45; 9EAO, 25; 9EGS, 26; 9BUE, 14; 9CRM, 77; 9DAE, 14; 9ADR, 64; 9BKO, 8; 9ZD, 4; 9AYL, 5; 9CDO, 29; 9ELZ, 8; 9BDZ, 7; 9DOJ, 20; 9RR, 127; 9ACX, 25.

NEW ENGLAND DIVISION

I. Vermilya, Mgr

MAINE—This month's report reminds us somewhat of the old Brass Pounder days with 1FM handling 370 messages. C. M. Sever of 1FM and his gang certainly deserve a lot of credit for the booth that they had at the Radio Exposition at Portland, it was during this time that most of the 370 msgs were handled.

Dist. No. 1: 1ALK is receiving cards from England and France. 1AUR worked Bermuda. 1PD is now using 50 watts and is being heard in England and France.

Dist. No. 2: 1APM is down on the short waves and is very FB. 1BNL has a new Reinartz tuner, and hears England, France, Holland and Central America regularly. 1BIT also has a new tuner and is hearing NZ nearly every morning. 1FM was at the Exposition Bldg. part of the time last month. 1KX has a new 50 watter. 1VF will soon have an O.W. on.

Dist. No. 3: 1BDH is doing good work. 1CRU is working British stations and Q2MK.

Dist. No. 4: 1ACO is going down on 80 meters.

Dist. No. 5: 1CX is working the 5th district with a 5 watter quite regularly. 1EF has worked G6NF and has been heard by several other Britishers also. He worked 9XI at 330 P with 5 watts input on 40 meters. 1EF has been shut down during quiet hours on 80 meters.

Traffic: 1ACO, 9; 1ALK, 57; 1APF, 80; 1APM, 4; 1AUC, 17; 1AUR, 4; 1BDH, 26; 1BNL, 54; 1BIT, 62; 1BUB, 123; 1CRU, 16; 1CX, 10; 1EF, 69; 1FM, 370; 1HB, 29; 1KX-1AXQ, 14; 1PD, 12; 1VF, 24.

EASTERN MASSACHUSETTS—Traffic has surely taken a big jump this past month, 851 msgs being handled by the fellows in Eastern Mass. Also, the number of stations reporting is very good indeed. Guess the old traffic is beginning to show its claws again.

1GA was the star traffic station. Right on his heels was 1BBK, and a close third was Miss 1KY. 1CME is reaching all over Europe on 30 watts. 1LM reports that store work is tying him up to some extent and had to drop schedules. 1BBM has raised his DX from 1200 to 1300 miles, and he bought a new 202 with which he expects to do some real DX. 1BZQ complains that the gang all want DX and no traffic. 1KY reports that the short waves are fine for DX and has several schedules with 2's. 1BS sends in his first report. 1CCT is on 80 meters. 1AYX had a little feminine QRM this last month. 1RR will soon be on with a complete new station from antenna to counterpoise and 50 watts behind it. 1AIR is putting up a new aerial and new 80 meter set. 1OV opened up during his school vacation. 1BBK is always ready to QDR any time for the gang. 1CJR has gone back to school, but was on during the vacation period. 1GA reports DX very VB on 700 meters with a 50 watter. 1BCN is doing good DX on a portable transmitter. 1ALL has surely been doing some tall DX work since the New Year. They have worked so many sixes and sevens that they have lost count. Also worked nearly every French and English station they heard, in addition to having worked Mexico, Holland, Italian 1FP, and last but not least, New Zealand. 1AYN would like schedules. 1AF-XJ is back on the air using two 50's on 75-80 meters. On the first few nights of operation fine DX was maintained with the west coast and England. 1ZW complains of the lack of traffic. 1SE worked 4 English, 4 French, and one Dutch station before his 5 watter went west. Is putting the 5 watter in an ebony case and would

appreciate name plate. He expects to be on with a 203A shortly. 1UW is after 1SE's DX, and is getting there too. 1BBG also reports fine DX on the short waves.

Traffic: 1GA, 76; 1CJR, 10; 1BBK, 74; 1OV, 22; 1AIR, 6; 1AYX, 25; 1COT, 4; 1BS, 32; 1KY, 68; 1AQY, 17; 1AVF, 23; 1BZQ, 42; 1LM, 39; 1CCT, 11; 1CME, 44; 1AHL, 15; 1UW, 2; 1SE, 8; 1NT, 41; 1ADM, 31; 1BBG, 65; 1AXA, 20; 1ZW, 22; 1AF-XJ, 18; 1DA, 34; 1AYN, 38; 1GS, 20; 1NV, 1; 1ALL, 15.

Dist. No. 3: 1VC expects to have a new mast up soon, but will operate on 150 meters, as he reports no luck finding traffic on short waves. 1ARE is experimenting on short waves with 1XU, but continues to handle traffic on both 150 meters and short waves.

Dist. No. 4: Raymond Nystrom, D.S., 1IL, has tendered his resignation to take effect at once. All O.R.S. stations please take notice and forward your reports to C.M. Isaiah Creaser, 1BSJ, who will take care of the work until a new D.S. is appointed. 1ABF is working European stations very regularly. 1PY is also very often heard working Europe, one of his latest stations being French 8CT. 1ON and 1BX, although not O.R.S., are heard often and have been reported in Europe. 1BSJ is experimenting with low power, and getting out well. 1BLU reports a power leak in his locality which prevents good reception. 1VU has not reported any progress with short waves as yet. 1APL is a new Springfield station. 1AIN has started up on short waves. 1AIN is now president of the Springfield Radio Assn., owing to the resignation of Mr. Howard Gourney. 1AWW is on the sick list. 1EO and 1IL are still operating on 150 meters. 1BYR is at college.

Dist. No. 5: 1BIZ reports his 50 gone west, and has been operating at 1KC. 1KC reported working GH1, Mesopotamia. The DX is about 6,000 miles. 1CI was home from school over the holidays and worked 25 European stations.

Dist. No. 6: 1BOM and 1BC are owned and operated by Dana L. Darling. 1BC is located on the top of Mt. Shelburne, about three miles from Greenfield. 1BOM is located at 19 Maple St., Greenfield, Mass. 1BC is usually worked Saturday night and Sunday. The location of 1BC is ideal, being far removed from any B.C.L.'s squeals or power leaks, with a wonderful view and elevation, which is high above the surrounding country.

Dist. No. 7: 1XZ is QSO Europe nightly, and has done some exceptionally long distance work. He is down on 40 meters in the day time and 75-80 at night. 1AAL was recently taken sick and must give up radio for a while. 1AQM has been reaching out in fine style, until his beloved 50 watter departed from this world. 1ANR is using a 1/4 K.W. tube and has a terrific punch. 1BBP is experimenting on 40 meters. 1BIP can use most anything in the line of tubes and still be QSO England and the west coast. 1DB is the only O.R.S. in the district on the upper waves. 1JV is dismantled. 1AKZ has dropped to short waves and holds the high total of 93 messages for the month.

Traffic: 1ABF, 24; 1AQM, 12; 1ARE, 15; 1AKZ, 93; 1ASU, 53; 1AWW, 90; 1BBP, 12; 1BLU, 16; 1BQK, 8; 1DB, 4; 1EO, 7; 1IL, 13; 1PY, 23; 1VC, 21; 1XZ, 21.

RHODE ISLAND—From the sound of things on the air, the Providence gang is running along about the same. 1BQD continues to be the only active station in Newport. Westerly's three stations, 1AAP, 1QV, and 1BVB, seem to be racing to see who can be heard the farthest. All three have been logged in Europe. Who will be the first to be heard in New Zealand? The single wire antenna and counterpoise at 1BVB has proven to be the only thing for short waves. It works much better than the old 6 wire cage.

Traffic: 1BQD, 17; 1QV, 99; 1AAP, 36; 1BVB, 127.

CONNECTICUT—The DX fever is still running a high temperature, and traffic seems to be secondary. 1AVW reports a bunch of stations worked using a 5 watter. That "Aver" sure does perk. OM. FB! 1BM received cards from England. 1CTI is changing over his set for short waves. 1IV hears New Zealand often. He buried a "50" recently, but has another working. Nothing but an earthquake can stop that Bridgeport gang! 1FD is working on 42 meters, using a 50 watter. 1CDE has sold out and is going to quit the game for a while. 1AOS uses a 5 watter. 1BGC is installing "S" tubes. 1AYR is out of luck! Will someone please loan him a transmitter? Hi! 1AEA is running as per usual. 1MK is the latest O.R.S. and continues to whistle. Give 'em your

messages for Headquarters, gang. 1XW is heard occasionally. 1AJT and 1BLJ are laid up. 1MY installed a 10 watt set at the Winter Exposition in the State Armory, Hartford, and handled a bunch of messages. The operators were 1BBE, 1BFL 1AVX, 1AKP, 1BIY and 1MY. 1APC has his antenna hung to the sky and is very QRW listening for Mars.

Traffic: 1MY, 132; 1MK, 55; 1XW, 8; 1AEA, 40; 1BGC, 12; 1AOS, 11; 1CDE, 32; 1AH, 26; 1CKP, 24; 1FD, 7; 1IV, 7; 1AVW, 19.

VERMONT—Practically all stations are down on short waves. 1YD is using a master oscillator on short waves and says it is FB. 1ARY, 1BDX and 1AJG are all QSO Europe, any time. 1CQM was on during the Xmas vacation, as his traffic report will show. 1FN, having recovered from his scarlet fever, has gone down on short waves, along with the rest of the gang. There is one notable exception. 1AAM, with ten watts, continues to work everything and everywhere on 150. Radio conditions in the state have been very peculiar at times during the last month; for instance, 1ARY and 1BDX both worked Europe and the Pacific coast the same evening, and fifteen minutes later were unable to establish consistent communication with each other—forty miles or so apart.

Traffic: 1ARY, 63; 1AAM, 16; 1AJG, 23; 1BDX, 42; 1CQM, 24; 1YD, 28.

NEW HAMPSHIRE—Traffic seems to be picking up a little, but we could still handle a good deal more if we could get ahold of it. Don't forget us, gang!

Traffic: 1YB, 83; 1BNK, 84; 1BJF, 67; 1ATJ, 78.

NORTHWESTERN DIVISION

Everett Kick, Mgr.

There was no record breaking transmissions reported this month, but traffic is on the rise and being handled more on the old time style form. Stations are making schedules during daylight, which makes messages delivered with greater ease. Many stations received a personal letter from Capt. McLean, Director of Naval Communications, thanking them for rendering the valuable assistance by establishing communication with the Shenandoah.

Washington—Traffic is on the incline towards bigger totals, but there seems to be interference of some source that troubles all over the state. The star traffic pounder is 7GB who handled over the hundred mark. 7GB just received his ORS certificate and his procedure for traffic handling can be rated as A-1. 7IX is on a trip to NYC and hopes to QSO with the 7th district hams while visiting there. 7MI is very busy trying to make his Super-sink work. Hi! 7AFO, 7AFN and 7AGI of Tacoma are heard quite regularly. 7AIM's antenna doesn't want to work on 75 meters. 7GR is installing a German 30 watt. 7FQ put in a 205A, but reports that it gets blue around the gills. 7RY and 7GE report light traffic. 7BJ can't be on much, but finds a little time now and then. 7AJY worked everywhere during Xmas but lost his 5er. 7AJV is having trouble making his set work. 7AIB and 7DC are working on the low waves. 7DF got his new antenna but burnt up a few condensers and millimeter. 7JR worked the east coast several times. 7AHA and 7LH with 50's do the same, only on higher waves. 7NO is coming down. 7BM finally got his chem. rectifier together. 7QX is quite puzzled to get his new 80' tower up. 7DI is QSO all over on a lone 5er. 7KU is the main-stay at Seattle, works everywhere. 7AEL and 7FD are having trouble making their antennas stand in place. 7FD worked m1B. 7ADP is on occasionally. 7ADQ, 7OY, 7GM and 7OW are on but no reports. (Why not jar loose OM's???) 7IH moved to Everett, will be on shortly. 7VV Everett's newcomer has 15 watts working. 7FN just received a report that there signs were heard in China. 7ABB is on once in a while.

Traffic: 7GB, 106; 7ABB, 46; 7KU, 32; 7NO, 28; 7LH, 26; 7FQ, 24; 7GE, 24; 7IH, 24; 7JR, 23; 7AIB, 22; 7AFO, 18; 7ZZ, 12; 7AJV, 11; 7AJY, 10; 7GR, 9; 7IX, 7; 7ADP, 6; 7DC, 5; 7DF, 5; 7BJ, 4; 7AGI, 4; 7IJ, 3; 7FN, 2; 7FD, 1. Total 462.

Oregon—Only one new ORS was appointed last month. 7AV was appointed new CM for Portland, due to 7AKK's leaving town. Please give your reports to him. 7SY is working all districts with a lone 5er, on 75 meters. 7UN is on occasionally on the higher wave band, he has trouble making his set work on the lower band. Hurrah! 7CQ and 7LR succeeded in working Australia and New Zealand respectfully. Each report handling of messages and

very steady sigs from the Westerners. They both use 50 watt bottles, with 7LR's running the hottest. Hi! 7ALD comes first for this month's message report. 7AIP next. Everyone reports that messages are becoming more plentiful, with less of the rubber stamp variety. 7AV, 7ADM, 7QD, 7LQ and 7CW are the most consistent stations going to Portland. 7FR has left for the U. of C., but 7ACM will keep the station going for the next few months. 7TQ and 7HH of Medford were home over the Xmas holidays. 7LS and 7MF are keeping up their part of the message report.

Traffic: 7ALD, 70; 7AIP, 58; 7MF, 47; 7LR, 35; 7QD, 34; 7AIX, 34; 7AKH, 30; 7FR-ACM, 27; 7AV, 26; 7LQ, 20; 7LS, 19; 7SY, 17; 7FP, 11; 7CW, 8; 7ADM, 7; 7FM, 1. Total 444.

Idaho—Activity throughout the state is good and practically all the stations are back again. Message reports are slack but it's hoped a 100% one next time, there probably is a new station close by or in your town OM's, give them a tip and have them report their totals. 7JP of Moscow reports that the north end of the state is going strong. He is on with a new antenna using CW on 80 and 170 meters. This marks the passing of Idaho's last spark bug. 7IU is doing FB working out in all directions. He has a mean DC wollop and is now having peace with the BCL's. 7GW reports that there is an awful power leak in his town. He blew his old faithful 5er, so has to rely on only one now. 7AHS is making a 5er do the work of a 50. He blew 4 tubes, then borrowed a BCL's 5 watt, from a power amplifier, to break it in and the funny part is, it did. 7ACF has a bad time to keep his antenna up from falling on the C/P, where he finds it most of the time. 7PJ is back again with the same old bang. 7FT and 7RQ are both on with 5 watt bottles. 7ZN-OT is still helping the YL at 7SI. 7YA promises to be on soon, no fooling this time. 7OB has a new receiver, hopes to work G6LG and Z4AA who reported his sigs recently. 7VU a new station in Boise, operated by Cecil Grow, has a 5er perking on 80 meters.

Montana—In spite of the favorable weather conditions practically no message reports were received. The only real active stations being 7MP and 7DD. 7MP ran out of 202's so uses 201's and gets out fine. 7DD is going to use a 50 watt with excess voltage on the plate. 7NT-XBA is QRW calibrating condensers and resistances. 7EL reports ND, too much school work. Ditto 7TD and 7GK. 7AGI had a brand new vertical ant. just ready to try out, but the wind came along and has to start over again. 7ZU sold his MG, will have some other source of plate supply soon.

Traffic: 7MP, 53; 7DD, 4. Total 57.

PACIFIC DIVISION

M. E. McCreery, Mgr.

Traffic is picking up considerably on the low waves and shows a great increase compared to previous months. Communication with Australia and New Zealand has been kept up and a great deal of traffic moves that direction. DX weather seemed to change quite often. Full moon might have been one cause for such rotten DX weather. A few British stations have been heard through the month. Many different foreign countries have been worked or heard which looks rather good for the future.

Dist. No. 1: 6CDV, 6CHX, 6CGC and 6ZH are now down on the short waves and getting out fine. The arc mush, which the poor San Diego fellows have had on the higher waves, is almost out on the lower waves. 6CGC is now using 100 watts and takes most of San Diego traffic. 6BAS is still on high waves but has a harmonic on about 80 meters and works some stations there. 6ZH is now using a 250 watt bottle and getting out fine. The antenna system at 6ZH consists of a one wire antenna 70 feet long and nearly vertical, with a large 12 inch copper ball on top. The counterpoise is a two wire fan.

Dist. No. 2: The traffic total has been a little higher than usual. The superintendent has found it necessary to reprimand some of the C.M's, so don't let it happen again. Messages are moving through Los Angeles with good speed. The outlook as a whole, is a decided improvement over previous months. 6BJX mourns the loss of a 30 watt. 6BQR has been fooling with various types of tuners,

including super-hets, but promises to be on more in the future. 6RF has a new station all fixed up for the short waves. 6BEG has been tearing around town trying to get parts for the new transmitter. 6AAO says not much DX lately, but his message total looks good. 6BRF has been off the air practically all the month. 6LJ the guardian of the souls of the 6th district, is reported to be using a one wire vertical antenna. 6BUR exchange sigs with 6ERY. 6CSS works all U.S. with ease though we can't say too much for his message total. 6AHP, the first station to QSO Australia, has been on very little this last month. 6BUW has been trying to work England on a brace of 204A's. The gang in Long Beach spurted a bit this month. 6CGW has a new water cooled 1000 watt. He burns up all the cats whiskers in the neighborhood whenever he steps on the key. 6CAE has worked NZ along with the rest of us. Fraternity life has found a staunch supporter in 6CNH, but he did manage to handle a single msg. 6RN is getting better and more traffic through because of less CQ'ing. 6CMQ will be on 40 meters shortly. 6BBQ finds plenty of traffic on the low waves. Santa Monica has the honor of claiming the first 40 meter station in this district. 6TS is the lucky man. 6AHD is off the air for good. 6AGK is on 40 once in a while. Our real friend and excellent traffic handler of the Antelope Valley, 6AKW, will take anything, anywhere, and at any time. 6CSW works DX in fine style. He is handling plenty of traffic. 6AFG gets reports from all the world and has been trying out various kinds of antennae. 6CBB has a hard time trying to find words to express his opinion of his power leak, but hopes to be on low waves soon with his 250 watt. 6IH has finally fixed his transmitter so it gets out in great shape. He doesn't let the mags on the hook get cold either. 6PL is now using 150 watts in tubes and working out in great style. He thinks that the low waves is the "cat's meow." 6ALF says that his girl was raised on tiger's milk. He doesn't stay home any more and op. (the boy with the gold nugget fist.) 6BEB says that in spite of heavy winds, he has been able to handle traffic fairly consistently. His latest achievement is working N.Z. with an input of 12 watts on one 5 watt. 6AJI says things are picking up on 80 meters. 6US has not finished his rebuilding program as yet. 6GT popped his 50 watt and is off the air indefinitely. He is giving up the job of C.M. He certainly held his side of it high during his time. It surely will take a good man to beat him.

Dist. No. 3: 6AKZ is on regularly now working the east coast and has several reports from Australia and Korea with 75 watts input. 6CGD will be on soon. 6ASV has been on seldom the last month on account of changing his set from 80 meters to 40 meters. 6JJ is stepping out great now and works all districts. 6CMD has been working on his set so has not been on much this month. He says traffic is good. 6CDG was off the air because of having his MG fixed. The pep in this district seems to be picking up compared to the previous pep.

Dist. No. 4: It is noticed that the traffic is jumping up and all stations are going full blast. Several are beginning to use the 40 meter band. 6NX has a new aerial, i. e., a 45' T., .1 radiation working east coast easily. 6LV is going to college and has not much time for radio. 6CJV is to drop to 40 meters soon. 6ALW got back from sea and is ready to go again with his 80 meter set. 6BON was reported by NZ and Australia several times. 6BDT worked NZ several times.

6ADB has been getting out good but ND with N.Z. as yet. 6AME has 3 ops and has worked NZ and logged by G2KW. 6ACU got out as usual. 6CCY is rebuilding his transmitter and aerial. 6MP is a new O.R.S. and handling lots of traffic. 6AOI is having trouble to get out but is rebuilding. 6CLP was reported very QSA by NZ 4AA. 6CJJ didn't do much this month. 6AFQ handled his usual amount of traffic. 6AMM gets out good with 1 5-watt. 6HC is experimenting with 4-5 meter transmitter. 6OI, a new O.R.S. handled 59 messages first month. FB. 6CEI didn't do much last month. 6BMW, a new O.R.S., is using a MO set and getting out FB.

Dist. No. 5: 6APH and 6ZAZ have been QRW with B.C.L. business so have been off the air. 6ACZ will be on short waves soon. 6CSL will have things going in great shape soon. 6ACR expects to have things fixed up before next report. 6CW is doing wonderful work. He has worked 12 Australians and all

U.S. and Canadian districts since he has been on 80 meters. He is using a 50 watt. 6CHL reports hearing G2NM and also CH 3TT. He worked Brazilian WJS, and up to date, he has been heard in 15 countries and has worked 7 of them. He expects to do a little better next month on the new antenna which is of the ORBULAR PARACHUTIC type. Hi! Tennis got the best of him lately. (Is it the tennis or surroundings, OM?) 6AWT reports that the last month has been all like a wonderful dream. He has worked a few more N.Z. and A's. He has been QSO with Australasia 60 times. He also received cards reporting his signals in Europe, South America, China and India. A ship op has heard him in the Philippine Islands, French Indo China, Malay Straits settlements and Korea and making a total of 8 Aussies and 6 anzacs worked. Japan. Another ship op has heard him off the coast of every Central American country. He is using an orbular parachute type of antenna. 6AWW is off the air due to illness. 6CSN just got his set to work on 80 meters. 6BAA is now on 80 meters and reports fine work. 6HJ will be on 80 meters soon. (Attaboy, OM!) 6BQL reports very little doing due to a very bad power leak around his station. 6BNT reports that his 250 watt went to land of eternal darkness. 6RW is still busy trying to get the set to work on short waves. 6BUF is working all US districts on 80 meters. (FB, OM!) 6AC has been busy making and breaking receivers but he has a good one now having heard G2OD on Jan. 14th. 6BFY will be on 80 meters soon. 6QS is having a little trouble getting his transmitter but will be going strong soon. 6DG has been off the air temporarily. 6CPW has been having his troubles trying to get on 80 meters. 6CLS reports a new antenna. 6CLV reports very little doing. 6AWO, 6AWW and 6JP are new O.R.S.

Dist. No. 6: It seems that the young ladies have gotten a pretty strong hold of all the boys around here. Tuff on the traffic department. 6CU, is busy at U. C. and doesn't get on very often. 6QV is a new station starting out right. 6AJF is busy experimenting at U. C. now and is working on a 1 meter set. (Good luck, OM!) 6ARB is after the YL's. He is running in competition to 6CKC for 6WP's sister. (May the best man win.) He has received reports from England, Belgium and Korea this month. 6BFU-6IM is having trouble with a sink rect. Both his poles are down but as soon as he gets them up will be back on 80 meters. 6CEG is on regularly between 1 and 3 a.m. He has a YL op. age 4 months. 6CDP will be on with a 5 watt. 6FR is second op there. 6CKC is now the Ass. (Wonder if King meant that—E.P.) Publicity Mgr. for N. California. 6CLZ heard UFT in France. He will be on 20 to 40 meters next month. 6CUT has moved again so has suspended operation for a while. His new QRA is 3706 Telegraph Ave., Oakland, Richmond; 6AOA takes the laurels for the number of messages handled. 6AOA—72. 6EW is doing fine work with 50 watts and has worked nearly all the states in one month. 6AOA is doing good work on 5 watts. 6HP has been rather handicapped as part of his antenna came down and he hasn't had time to put up another. 6CTX is doing fair work on 150 meters but will be down on 80 soon. 6ANW is now on with 5 watts. He hasn't gotten off the coast yet, but here's hoping.

6ZX-6KR is down on 80 meters now and works the east coast whenever he is able to get on the job.

Reports coming from districts 4 and 5 are sure F.B. What's the matter with you fellows in district No. 6? Get a good report from Richmond and Berkeley districts, but you fellows in the Oakland district are a dead bunch, as the C.M. informs me that he got TWO O.R.S. station reports. Fellows, this is rotten business, and there will be a slaughter of O.R.S. certificates if you don't wake up. Don't think that the C.M. is going to phone you fellows up every month because N.D. If you are not interested in A.R.R.L. affairs, why should he be interested in you? If you haven't got form 1, holler for them and your C.M. will send them to you. 6TI-6BIP just got a card from F8CS having been heard on December 21, 1924, and it cks with their log. 6UR and 6TI-6BIP and 6KR are the only stations reporting in the Oakland area, and it's sure a very bad showing and the A.D.M. wants to see a better report and don't ask, fellows, "What's the matter with the SIXTH dist. when you don't report any-

thing at all. In fact, I'd be ashamed to ask. Come on gang, let's produce the old stuff we used to give the C.M. By the way, the A.D.M. has a phone now of his own and any of the gang that want to get in touch with him can do so by phoning Humboldt 4065—P. W. Dann, 562 35th St., Oakland, Calif. A. D.M. districts 4-5-6 A.R.R.L. Calif. Pacific division.

Come on fellows, come through with a "knock-out" report for January because the A.D.M. doesn't like to kick but he's got a kick coming. What's the matter with you Alameda gang—all DEAD, too? Better wake up, C.M. Alameda, and give me at least a report, as I know there is activity over there!

You D.S.'s are not getting the reports in to my address by the 20th, either from faulty address, as one of the gang addressed it 35th Ave. and it should be street, and the report was delayed a day or so. Don't forget to look at your calendars a little while ahead, fellows, and if the 20th falls on a holiday, Saturday or Sunday, get it to me before the twentieth. Use the dome, fellows!

Dists. No. 7 and 8: There are no reports from any of the gang in district 7 and 8 this month. What is the matter, fellows? Have the YL's or OW's got you, or are you just plain, dead? If there is no more activity in district No. 7 and 8, next month, there will be a new gang in charge. Runyon is the only one who is doing his stuff at all.

Traffic: 6CGC, 20; 6CDV, 4; 6CHX, 7; 6ZH, 18; 6RF, 3; 6AAO, 46; 6AFG, 60; 6BJX, 79; 6BQR, 4; 6IH, 8; 6CSW, 34; 6CTO, 67; 6CBB, 6; 6LJ, 22; 6CGW, 20; 6CAE, 9; 6CNH, 1; 6RN, 52; 6CMQ, 19; 6BBQ, 38; 6BUR, 6; 6CSS, 4; 6AHP, 10; 6BUW, 10; 6AGK, 10; 6AKW, 13; 6GT, 27; 6BEG, 46; 6AJJ, 29; 6PL, 154; 6AKZ, 5; 6ASV, 6; 6JJ, 15; 6CMD, 11; 6CDG, 4; 6NX, 3; 6LV, 11; 6CJV, 15; 6ALW, 37; 6BDT, 9; 6ADB, 20; 6AME, 25; 6ACU, 8; 6CCY, 30; 6MP, 28; 6CLP, 5; 6CJJ, 3; 6AFQ, 4; 6AMM, 16; 6OL, 59; 6CEI, 4; 6AC, 20; 6BUP, 22; 6RW, 6; 6BNT, 6; 6BQL, 14; 6HJ, 8; 6BAA, 24; 6CSN, 5; 6AWT, 40; 6AWW, 14; 6CW, 68; 6ACR, 4; 6CSL, 1; 6ACZ, 3; 6CHL, 25; 6BLM, 41; 6GU, 18; 6QV, 42; 6AJF, 3; 6ARB, 36; 6BFU-6IM, 8; 6CEG, 16; 6CKC, 38; 6CLZ, 2.

ARIZONA—GANO is doing fine work handling a bunch of traffic. GASK and GCSO have handled several hundred msgs this month, especially interstate traffic but did not get their report in on time. They have two ops on every night at 6CSO and GASK and are QSO 5, 6, 7, and 9th districts. 6WI has closed his station in Flagstaff on account of other duties interfering with his work this season. (Sorry to lose such a fine old timer.) 6CUW is working 6PZ nightly and QSO west coast. 6ZZ is on the air again industriously experimenting with stunts to overcome dead rec location and the shorter waves. Some work.

Traffic: 6CUW, 17; 6GS, 8; 6PZ, 6; 6ACN, 10; 6ZZ, 8.

NEVADA—GUO has quite a little trouble in working Reno, Nevada, although it is only 90 miles from Yerington, but has a schedule with 6AJP. It is hoped to have 6CRV on the air very shortly.

Traffic: 6GUO, 69.

HAWAIIAN ISLANDS—Things are moving along about the same. The gang is still dead. As a whole, the division seems to be picking up on the outskirts with the exception of the Hawaiian Islands. Dists 1, 1A, 2 and 3 are still battling along at a good rate under Brockway. Districts 4, 5, and 6 are doing better this month than before and a great improvement has been noticed in district No. 5. Keep up the good work! Dist. No. 7 and dist. No. 8 have fallen down flat. Arizona has picked up to quite an extent. Keep up the good work! In Nevada we have four or five stations lined up, as against two for last month. This is FB! It is noticed that the traffic department report totals are increasing, likewise QRM on 75 to 80 meters. The D.M. finds it quite possible to copy east coast stations harmonics in the vicinity of 40 meters.

In conclusion, wish to ask the gang to get on their toes and send in their contributions toward a Pacific coast delegate to Paris to the convention of the I.R.U. Send in your contribution together with your vote for whom ever you wish to go as your delegate, to Mr. A. H. Babcock, 65 Market St., San Francisco, Calif.

XII

ROANOKE DIVISION W. T. Gravelly, Mgr.

WEST VIRGINIA—SASE-SAGH works all districts except the sixth and seventh at noon with a 20 watter. He is putting in a 500 watter now. 8BSU-8AKZ is off the air putting up a new mast and installing a 100 watter for short wave work. 8DFM works the sixth district nightly and has been reported in New Zealand. SZW-SBSY, home from Carnegie Tech., knocked off a few messages. 8BSK is a new station. 8BLI put in a new stick. 8DSN, with a 5 watter (?) works sixes and sevens FB. 8AIP is still on high waves. 8DOI and 8AMD are very active stations. 8CFE is on the air again and handling traffic. 8DES, home from school for the holidays, was on the air. He is operating at the school station.

Traffic: 8DFM, 48; 8ZW-SBSY, 5; 8DES, 16; 8DOI, 19; 8AMD, 11; 8CFE, 1; 8DSN, 5.

NORTH CAROLINA—Dist. No. 1: 4OG, 4FA and 4TW have been issued O.R.S. certificates. 4OG and 4FA turned in traffic reports and are yelling for more. 4FA is working on both 75-80 and 150-200 meters. He is QSO Porto Rico and all but the seventh district. 4OG is doing good work on the 150-200 meter waves and says he doesn't like the short waves. 4LO will be on with a 50 watter. 4QW is on the air in spite of the fact that he is away from the station most of the time. 4NV is QRW jewelry business and his YL, so guess ND 'till after the wedding. Hi! 4AF was on during the holidays and raised a lot of racket on the short waves.

Traffic: 4OG, 27; 4FA, 21.

Dist. No. 2: 4MI sends in his first report as D.S. direct to the A.D.M. over the air. This is a good plan fellows and gives us something to do besides listening to CQ's and chasing all around the tuner hunting somebody with messages. 4NJ-4VN is wintering in South Carolina so he hasn't been on the air. 4GW has a regular "He" set now—500 watts—and is tearing up the tuners everywhere. 4TS worked a seven using a single wire antenna 22 feet high and on the 150-200 meter band into the bargain. Somebody beat that! 4TS will be on the short waves soon. 4MI shot his 50 so he is now using two fivers and gets out about as well.

Traffic: 4MI, 35; 4GW, 21; 4TS, 16.

Dist. No. 3: Things are running along just as usual with 4TJ and 4JR in the lead. 4JS was on during the holidays and did some excellent work. He heard a bunch of English stations with "bed spring" aerial—howzat? 4HR is raising an awful racket on the upper waves with one five watter. 4TJ has "rotten" power leak. "rotten" DX, WX, dead tubes, bum synk and bum condensers, in addition to losing his antenna the night before Xmas. (Gosh, Man, where do you get that stuff? —D.M.) He is now on the air with a 500 Mullard. 4JR has had his share of trouble also. His tubes quit on him and the wave jumped all over the short wave band. He has two fivers yet. Both 4TJ and 4JR get good results on 40 meters in daylight.

Traffic: 4JR, 90; 4TJ, 37; 4JS, 20; 4HR, 9.

Dist. No. 4: 4NT-4MA have combined junk, and are back on the air. They have been issued an O. R.S. and it looks as if they will put some peg in things. We are very sorry to announce that one of our best stations, 4SU, is no more, as he has moved to Florida. 4RW is having trouble in getting a good radiating system in his new location, but has about solved the problem and will be on the air soon. 4FT is going strong on 75-80 meters, also on 200 meters, but won't take out and O.R.S. 4BX finally managed to get going. 4UN shot four fivers and battery charger bulb and has, in other ways, been out of luck.

Traffic: 4NT-4MA, 8; 4BX, 2; 4UN, 6.

VIRGINIA—Dist. No. 1: 3CJU can't seem to get out. Only Norfolk O.R.S. with a 30 cycle A.C. note. He just got a Low-Loss tuner perking FB. 3MK's message total sure looks good using 4 VT-2's and has up the long-promised new stick. He is using aerial of one strand trolley wire. 3CKK has been having all kinds of trouble; too cold in the heatless shack, and the old affliction of bum storage batteries. 3CKA is seldom heard, QRW school. He uses 80 and 150 bands. 3TI is using two 5 watters in full wave rectified circuit. No DX, but reliable QSO for about 600 miles, and gets loads of traffic south. This district put on a station assembled and operated between 1 and 11 P.M. at the Radio Show at Norfolk,

QST FOR MARCH, 1925

operating the station under the station license of 3KS. The station was assembled and in operation in a few days and worked 75-80 meter band. In the excitement several fivers were sent west. 3IN's



10 watter supplied with 600 volts from MG set, finally was made to do the work. The antenna gave trouble being erected in the steel building, but was changed outside the building and better results were had. The following A.R.R.L. members operated the station: 3TI-3KS, 3MK, 3CKA, 3AFX, 3SW 2CEV-KOC, 3OL, 3CJU, 3AEK, 3IN, and 3UV. A large crowd was always around the booth being shown the way in which traffic is handled. A total of 141 messages were handled, some replies were received by radio and by mail, one message to California was delivered in due time so the sender states. Credit is given the following stations for the consistent relaying of traffic from these stations: 3BWJ, 3AHA, 3CDG, 4JR, 3BAU, 3AME, 3DBM. All A.R.R.L. stations in the city assisted in handling traffic as 3KS was swamped at all times. The booth was the most attractive at the show and was constructed at very little expense. A super-hetrodyne was operated only 20 feet from the transmitter and no QRM at all. (And still we have to QRX for the single circuit birds—D.M.)

Dist. No. 2: The hams around Petersburg are trimming their aerials now for short wave work. 3ATB QRW work, but keeps in code practice with a saxophone! 3ABS lost both sticks in recent sleet storm. He is erecting a temporary one now and remodeling for 80 meters. 3BMN works west coast regularly, worked C5BA and Porto Rico often. He handled 42 messages and was QRV a lot more. 3UY and 3HM, are working regularly on 150 meters. 3AUU erecting a gutter aerial and planning 20 and 40 meter work.

Dist. No. 3: 3BGS has his four coil Meissner on 150-200 meters and expects to get down on the short waves right away. 3BFE was forced to dismantle on account of the station being operated on Southern Railway property. 3BUY has worked across the "Pond" and also works sixes and sevens—handled 12 mgs. 3CFW is trying out low power with storage batteries. 3BZ is on the air now since the street car people ran out of sand. He handled 2 mgs. 3CKL blew his pet fiver and has been reported in South America. He put up a single wire aerial thirty feet long and fifteen feet high and worked 6BHW on an input of 40 watts and antenna circuit. He handled 27 mgs. 3CA handled 10 mgs.

ROCKY MOUNTAIN DIVISION N. R. Hood, Mgr.

UTAH—Dist. No. 1: 6CJB has his new station going in his new home, and is going strong on 75 meters. 6CKI of Logan is attending the U. of Utah and has little time to devote to his set at home. He reports that he is now operating the University station, 6CAF. 6FM is sick in bed at the present, and we hope he has a speedy recovery. 6BLH has perked up and is doing some excellent work on short waves. 6BUH reports his 50 watt tube has gone west and is now on with 5 watts. He is on 80 meters. 6RM-6ZBS has been able to devote only a couple of nights to his set, but will be on regular soon. 6RV has put thru 77 messages, but is not yet an O.R.S. or he would have been in the box sent this month. His O.R.S. has been approved. 6CRS is another station due for an O.R.S.

Traffic: 6CKI, 6; 6CJB, 6; 6FM, 12; 6BLH, 50; 6BUH, 6; 6RM, 10.

WYOMING—7AJY put thru the most messages this month, and did that in 10 nights. 7HX ex-7DH
QST FOR MARCH, 1925

ranks second with 24, although he is doing a lot of experimenting and puts lots of time at his set. 7HW reports no traffic, but is also doing considerable experimenting on long and short wave reception. 7ZO and 7LU are out of operation for the rest of the winter, although provision has been made with Casper amateurs to have a set in readiness for any storm emergency work that may come up.

Traffic: 7HX, 24; 7AJY, 82.

COLORADO—Sorry to say, but no report received at the D.M.'s office on February second, when this report goes forward by air mail to reach QST factory on time.

SOUTHEASTERN DIVISION H. L. Reid, Mgr.

ALABAMA—A survey of reports coming in from the various Dist. Supts. shows quite a pick-up in activity. District No. 2 stands out this month for traffic handled with District No. 3 following second. 5AC leads the state with a total of 64 messages. District No. 3 reports the most activity and several promising new stations.

Dist. No. 1: This district, although the largest in the state, reports the least activity and the smallest amount of traffic. 5VV is doing consistent work on a lone 5 watter, working the first district with ease. 5AMH seems to have been wrecked by the lower waves, for he has not been able to reach out consistently since deserting the 150-200 meter waves. 5ACM and 5QP are the only other stations reporting.

Dist. No. 2: Supt. Rush reports that 5AC led 5QK by 4 messages, which shows close competition among the Mobile gang. 5QK certainly did his duty as a new O.R.S. (Good work, old man!) 5AAD will be on the air shortly and will add another station to the South Alabama gang. 5AOM is reported to have a very bad case of "YLitis."

Dist. No. 3: Considerable activity is reported from Montgomery. 5AJP, 5ADA and 5NL are handling traffic consistently with 5ARW, 5ASU and 5ATT as promising material for O.R.S. The Montgomery gang is showing lots of real "ham" spirit under the leadership of 5AJP. This fellow, Trum, must have the true "ham" spirit for it has been reported that he has known to break a date to go help out a fellow "ham." 5WI reports 26 messages. 5WI works consistently. 5DI has come to life and will probably receive an O.R.S. certificate within a short time.

Dist. No. 4: Something happened to 5XA this month for they only report 12 messages. Yep, it is the fact that they are rebuilding for the low waves. 5XA can now be heard on 77 meters and is waiting for the traffic with a full staff of ops.

Traffic: 5AC, 64; 5ACM, 18; 5ADA, 25; 5AJP, 47; 5AMH, 13; 5AOM, 5; 5AR, 5; 5NL, 2; 5QP, 10; 5QK, 60; 5QP, 10; 5VV, 20; 5WI, 26; 5XA, 12.

GEORGIA—Dist. No. 1: 4EQ works Europe at last! 4KU is doing good work as usual and worked Costa Rico. 4OA, working on 40 meters is doing excellent work. (FB, OM.) 4SI has been heard in England, also leads the traffic total this month with 40 mgs. 4IO worked Spain and passed the 50 mark in Europe QSO. 4QF works Europe and the west coast with ease.

Dist. No. 2: 4DY has finally moved down to 80 meters. 4PL was out of town all month. 4WJ is a new station in Macon. 4FJ is doing good work on 150 meters. 4FX worked England and is doing good work as per usual.

Traffic: Dist. No. 1: 4EQ, 13; 4IO, 21; 4KU, 15; 4SI, 40; Dist. No. 2: 4BW, 8; 4DY, 2; 4FZ, 58.

FLORIDA—A general increase in enthusiasm resulted from the Florida Convention which was held in Orlando January 1st. Various traffic matters were discussed, every ham present pledged his support in upholding the League's CQ regulations, and much good was derived from the meeting.

Traffic is becoming normal again since experimenting had its inning. 4KK works Cuba regularly and handles most of Jax's traffic. 4FS worked G5LF with one 5 watter and 60 watts input. 4PK is copied regularly in N. Z., So. American and Europe. St. Augustine is not so lively of late; 4SB gets the DX but very little time for traffic. Central and Southern Florida have "copped" the laurels from Jax. 4XE is active on all waves down to 18 meters—does extensive experimental work and

still found time for 89 mags. He and 1XAM worked all day January 11th, 4XE using 18 meters and 1XAM 21, with good steady sigs at both ends all day. 4XE has been named O.W.L.S. (Official Wavelength Station) by the Wallace-Jansky committee, and will announce his transmitting wave each time upon signing off. 4BL has returned from radio school and re-established Lakeland as a relay point. He worked 5 sixes with one 5 watter and 40 watts input. 4IZ is Florida's authority on 5 meter stuff, but also handles traffic on 80. 4UA, new O.R.S., has made himself important as a traffic man. 4PB and 4QY are pretty busy but doing their best. Miami and vicinity has seven active stations. 4FM worked N. Z. with two 5 watters.

Traffic: 4KK, 15; 4XE, 89; 4UA, 41; 4IZ, 31; 4FM, 19; 4QY, 17; 4BL, 23; 4PB, 13; 4SB, 12; 4CH, 12; 4NE, 7; 4FS, 8; 4PI, 2.

SOUTH CAROLINA—4HW is going strong again and has just received an O.R.S. Traffic was light this month, the total number of messages QSR'd being only 31. Of these, 27 were handled by 4IT. 4RR is still trying to get his transmitter working satisfactorily again, but N.D.

Traffic: 4RR, 4.

PORTO RICO—With ideal radio weather prevailing at present our hams, and especially 4SA, are accomplishing the undreamed-of. Dependable communication with France, England and Argentina has been effected. 4BJ, 4JE and 4KT have done their best to keep traffic with the United States going. 4OI has not started his station this winter as yet.

Traffic: 4SA, 27; 4JE, 19; 4KT, 13; 4BJ, 24.

WEST GULF DIVISION

F. M. Corlett, Mgr.

Things are picking up in the West Gulf this month. Seems like most everyone is working foreign countries, and the old line, on our cards, "DX all states, Canada and Mexico," is sure enough old stuff. Traffic is better too, and with the return of the "Brass Pounder" League this feature should care for itself. Now! In one Texas City the Supervisor of Radio has ruled no more low wave licenses will be issued until the Listener complaints are stopped, and in another, we hear that the Supervisor wrote to an A.R.R.L. officer, "Please inspect the sets at (several local low wave stations) and if they are built as the operators tell me they are, their licenses are cancelled! or words to that general effect. Seriously, our low wave transmitters must not have harmonics or reradiation in the broadcast band—we have too many enemies to set out making more, besides, the S. of R. won't stand for it.

If we don't handle non-emergency messages, will we know what to do with 'em when we do run into an emergency? If we don't deliver the messages what is the use of relaying 'em?

NORTHERN TEXAS—This month's DX records show that 5NW was QSO both Australia and New Zealand. 5DW worked G20d, 5AKN worked NZ2AC. 5SD was QSO A2YI and SJ; 5CV worked NZ2AC again.

The chance for storm relief work came, and Texas A.R.R.L. men met the call promptly. On Sunday, January 18th, most of North Texas telegraph and telephone wires were in trouble with a heavy ice—heavy for this section of the country. At 2:30 that afternoon the Postal Telegraph Company at Ft. Worth informed 5ADR of the Star-Telegram force that they might need amateur assistance in handling messages out of Ft. Worth before night. 5ADR put 5OT, Ft. Worth C.M., wise about it, and within about 15 minutes five of six outlets in different directions were opened from Ft. Worth to other Northern Texas cities. The Ft. Worth stations called others and had them stand-by to handle the biz if it became necessary. Cow Town stations who stood by for them were 5AJH, 5ZG, 5AEX and 5BX. These routes of communication from Ft. Worth were kept open until after 6 o'clock, when the A.R.R.L. men were told that wire communication was again regular, and they would not be required.

Traffic: 5AKZ, 16; 5ATX, 10; 5AFU, 33; 5SD, 24; 5CV, 2; 5WQ, 2; 5AKQ, 9; 5ASZ, 3; 5AGQ, 32; 5AQC, 5; 5OT, 37; 5RM, 2; 5ACL, 10; 5HY, 40; 5AKF, 23; 5AFH, 7; 5AJT, 34; 5ZH, 2; 5OQ, 6; 5UO, 4; 5UV, 71; 5QY, 33; 5FC, 24; 4JP, 14; 5ADH, 4; 5CC, 34; 5LL, 2; 5ALJ, 52; 5ADV, 24; 5ADD, 14; 5AMB, 13; 5JH, 17; 5DW, 8; 5NW, 11; 5AKX, 3; 5AMS, 6.

SOUTHERN TEXAS—Dist. No. 6: There are about half a dozen stations in Houston which we hope soon to include in our list of O.R.S. 5CA has applied for one. 5UY will also be at the 5CA key. 5OX is doing excellent work and continues one of our greatest DX stations. Galveston is coming to the front, 5ZF being at present the only O.R.S.

Dist. No. 7: 5UJ is hard at work fixing his low wave receiver and transmitter, and he will be on the air strong any day. 5ALB is on strong, but reports unusual shortage of traffic. He, like 5OX, of Houston, works the Aussies and also New Zealand. FB, OM! 5FT is using 100 watts on 174 meters, and is QSO anywhere. The coastal plain towns, Beeville and Cuero, are doing their bit; 5ZAI at Beeville and 5JT and 5RA at Cuero. 5GW at New Braunfels is still almost dormant.

Dist. No. 8: E. G. Conroy, C.M., San Antonio, says his is picking up in his section. Conroy sends a lengthy report, boys, and he wrote it in bed, sick. That's the spirit, fellows! (And to back up his comment, the A.D.M. apologizes for his three page report to the D.M., explaining that "Am sick, and wrote this in bed"—give the other fellows a boost for good work while doing the same thing, and making no boast of it—D.M.) 5MN works ones and twos easy as locals. 5WP is on 80 meters with 50 watts. 5ZAE has been off the air, as his set was out of operation, but Mr. Wall surely is active in A.R.R.L. matters, and he is an ideal D.S. 5UX-5ABZ has gone to Corpus Christi and installed 5ABZ on his yacht, the "Bridget". Amateurs should be on the lookout for 5ABZ's sigs. Mr. Conroy, 5XAQ, is again working under his old 1920 call, 5ACZ. He is on 80 meters. The work he did during the Texas blizzard (you know which blizzard—D.M.) appeared in every Hearst paper in the U. S. on January 3rd. (FB, OM!) San Angelo is represented by 5ASP and has a good traffic report. 5MS and 5ABJ are continuing splendid work at Corpus. 5EW, at Brownsville, has been sick, and also lost a tube, but he is back on the job, working on 80 meters only.

Dist. No. 9: No report—(what's the matter, Mack?)

Traffic: 5FT, 23; 5AEP, 19; 5EW, 12; 5ALR, 5.

OKLAHOMA—Conditions in Oklahoma seem to be slowly improving. Although traffic is very light, stations are beginning to report. Eight stations outside of Oklahoma City reported this month.

Dist. No. 1: This district showed the most activity. 5APZ is building a 5 watter, in addition to his 20 watter for use on 75 meters. He reports that the OW has received her operator's license and will be first "Op" at 5APZ from now on. Don't crowd, fellows! 5CU takes honors for this month. 5ABE states that important business kept him off the air the past month. (Bet it was feminine—A.D.M.) 5APY wails that everybody was calling Europe and wouldn't handle traffic. 5UJ was moving, but is going again now. He wants to know who puts out the official broadcast for this vicinity. How about it, F.M.C.? (ask 5ZM and 5ZAV about it, F.M.C.) 5ADE dropped in the other evening and said he was on with a 50. Wanted to know how to qualify for the "Brass Pounders League". Watch him, fellows! 5APG is rebuilding, but says it's a dum fozzled bum time to do it.

Dist. No. 2: No traffic was reported, and what dope we have was reported by 5GJ. 5GA lost two 203's, and is so discouraged that he don't know whether he will come back on or not. 5GJ will be back on 75 to 80 meters with a couple of fifties as soon as he completes his 92T type low wave neut. There is considerable activity around Cushing and some at Copan. (C'mon, fellows, pep up a bit and give us a report.) Tulsa is DEAD!

Dist. No. 3: Still sleeping with King Tut.

Dist. No. 4: 5ZAV-5AIU combination heard G2NM, RA8, RLOH, F8AB, and was heard by RCB8, G6BQ, G2LZ and G2ACK. They worked SJ in Costa Rico on 20 watts input and all on 83 meters. D.S., Wm. Green and LeRoy Moffett have formed the Green-Moffett & Co. Radio Engineers at Norman, Oklahoma. Wonder what's become of 5AHD? Dead or married?

Traffic: 5APY, 4; 5APZ, 15; 5UJ, 1; 5CU, 92; 5ADO, 13; 5ANL, 13; 5JU, 12; 5AQW, 9.

(If we are to show TEXAS HOW THE CALF ATE CABBAGE we'll have to do better than we have been doing—A.D.M.)

CANADA

The past month has been one of steady improvement in Canadian amateur affairs. The Wednesday night "prayer meetings" in which all the Canadians participate on 125 meters are a great success, and constant reports are coming in that so many Canadians were never heard on the air at one time before. As expected, various trans-Continental records are established every week, the latest being a two-way message from Halifax to Vancouver and back in twenty minutes, carried out via 1EI, 3NL, SBJ.

In connection with the 125 meter wave, it is pointed out that the Canadian amateur is going to lose this wave as of April the 1st next by reason of the Canadian-United States conference at Washington some months ago, by which all the shorter wave bands were apportioned. We are, however, assured that on the loss of this wave band from 125 to 160 meters the Canadian amateur will be given another wave band of probably 5 meters in width and probably slightly shorter in wave length which will be for his own use exclusive of the band in use in the United States. This will create a situation very similar to the present British system by which nearly all the British amateurs can be found on a band of waves between 90 and 100 meters, except that the Canadians will be probably between 115 and 120 meters.

The time chosen for our Wednesday night show is rather unfortunate in that while it is 1:30 in the morning in Nova Scotia it is only 9:30 the previous evening in British Columbia, and therefore quiet hours are in force in that Province. At the present time it seems rather hard to get around the time difficulty, but we may be able to get our Eastern stations on a little later and in that way to move the time forward and satisfy the Western end of our relay chain.

Another item in connection with our relay work on Wednesday nights is the fact that arrangements have been made with British stations to listen on Wednesday nights from 5:30 A.M. G.M.T. onward on 125 meters instead of the usual 75 so as to make a British Empire relay. This chain will be in active operation by the time this appears in print, and no doubt further records will be established.

The southern portion of Ontario is within the region of total eclipse on January the 24th, and two Toronto Stations are to transmit special signals during this time for test purposes. Reports will appear in later issues of QST as to the results achieved during these tests.

There is also a scheme on foot for the establishment of a relay chain operating in the 40 meter band to make some daylight tests on these waves. Preliminary tests have shown marked improvement for daylight work of the 40 meter band as compared with 80 meters, Montreal and Toronto having been in daylight communication two-way at noon on these waves with great signal strength. These tests are being carried out further, and we hope to be able to give full results in Canadian section of later issues of QST.

The elections for division managers in the Ontario, Quebec and Winnipeg divisions have resulted in the re-election by acclamation of Mr. J. V. Argyle of Montreal as manager of the Quebec division. In the Ontario division there are five nominations for the office and five for the Winnipeg division. Ballots are now being sent out in the latter divisions for the vote, and we expect to publish the results of the other two divisions' elections in the next issue of QST as well as by the usual weekly broadcast message.

MARITIME DIVISION

W. C. Berrett, Mgr.

This month has seen the arrival of several new stations in the Maritime which have been promised for a long time and it is with great pleasure that we welcome them to the already well known Maritime stations. Things have happened so fast and furious in amateur radio during 1925, which is only one month old, that it is hard to predict what will take place before another report goes in. 1DD takes claim to prominence among the gang for having worked CB3 in Argentina on January 25 and has the honor of being the first Maritime and the second Canadian station to become QSO with the Argentine, 3XI, being the first Canadian to work him just one hour ahead of 1DD. In addition to

this super DX on 85 meters, 1DD, has been working a lot on 40 meters and has worked 1000 miles at noon. It will interest the gang generally to know that one station, i. e. 2CG of Montreal, with whom he has worked at noon on 40 meters was able to work consistently with the Maritimes using one 201A with 350 volts on the plate, a feat which we in the Maritimes must strive to beat. For real daylight DX 40 meters seems to be the choice. 1EB did some useful observation work on 80 meters during the eclipse of the sun and reports that the signals from those areas affected by the eclipse were equal to those conditions that prevail at night. The regular Wednesday night trans-Canada tests on 125 meters have been a decided success and among the stations heard on the job were 1AM, 1AB, 1AF, 1EI, 1AI, 1AE, 1CO, 1DJ, 1AW, 1DD and 1AR. It will be noticed that NB. is very much in it (FB.) 1CO deserves special mention for having brought PEI back to the fold with a splendid signal. 1AR is working the whole world and has added two Italian stations to his already wide-world DX list. He is the first Maritime, and it is believed, the first Canadian to work Italy. Besides Italy, Joe has worked England, France and Mexican stations this month so is without doubt our leading DX man and deserves full credit for his good work. 1DJ is now on regularly handling traffic and has 8 messages to his credit this month. 1EB has handled 1 msg and has worked all U.S. districts except 6 and 7. 1AR has handled 8 msgs besides his super DX work. 1DD has handled 23 msgs. 1EF if off the air and is suffering from the loss of three tubes but should be back soon. 1DF, who started off in great style last month, finds that Senatore Marconi & Co., need most of his time, and is unable to spend much time at radio. His O.R.S. is therefore cancelled at his request. 1BV has taken a slap at the extra short waves when home on week-ends but while he is not on the air much, is doing excellent work as touring representative, and boasts A.R.R.L. whenever possible. 1BQ reports nothing doing on traffic but is doing some experimental work and the gang is looking forward to his lecture before the Nova Scotia Institute of Science, on short wave transmission and reception. His very low wave set will be one of the things the gang will all want to see when they assemble in Halifax for the annual convention on March 21st. Letters are coming in from all points promising to attend this years convention and in addition to other attractions we will have a visit to the big-transatlantic radio press station at Geizers Hill on our program. 1AA, the amateur call of the Supt. of Geizers Hill station, promises to come on soon and give us a little practice at 35 per. Hi! 1AO is a new Dartmouth station which will be on the air this month 1BZ will be off the air until May as he is in Montreal taking a special course. 9AK has not been heard of for some time. 1CO is the sole representative of PEI putting out a signal and it is hoped that he will come to Halifax on March 21 to represent his Province.

NEWFOUNDLAND — Newfoundland is on the amateur radio map. 8LR, operated by Loyal Reid of St. Johns, worked 1DD for over an hour using 240 meters with 1DD on 125 meters, on one of our regular weekly Wednesday night Trans-Canada tests at 1:30 p. m., A.S.T. All Canadian stations please listen for this station on 240 meters every Wednesday night. He is building a short wave transmitter and will soon be on 125 with the rest of the gang. Newfoundland 8LR, uses the intermediate "C," the same as Canadians. 1AF is a regular attendant on the weekly tests and is reaching out well. 1AB also gets on the job with a good signal. 1AM had a dab at the 75-85 band and put out a very QSA signal all over the division. 1AN is our latest O.R.S. 1EI is heard at all times and on account of his daily or nightly work is liable to be found at any hour of the 24 pounding brass. 1AI has burst forth, and with the best aerial we have seen for a long time, is QSO Halifax and Toronto on 135 meters. 1AE is using only one five watt. His signals sound like a whole lot more in Halifax and with 1AW he is keeping Cape Breton on the radio map. Davison, ex-9BL, is back with ham radio with both feet. Hi! His new call is 2PT! Final arrangements are being made for our convention and the Nova Scotia Inst. of Science is putting on some very interesting lectures and demonstrations for us during the afternoon of March 21 at Dalhousie University. Dr. Ritchie,

the president of the Institute, assures the gang of an afternoon, that in addition to giving us the radio information that all hams want, will be remembered as worth the trip to Halifax. Mr. Hebert, the League field man, will be on hand and our famous orchestra, "The Antenna Sextette," is better than ever. Among the subjects to be discussed will be the coming meeting of the I.A.R.U. at Paris. Again, gang, please send photos and articles to the D.M. for QST.

QUEBEC DIVISION

J. V. Argyle, Mgr.

The D.M. wishes to express his pleasure at the mark of confidence in being re-elected by acclamation, and to assure the boys that he will do at least as much for the Division in the future as he has been able to do in the past. All existing appointments are hereby renewed.

This month was not so active as the last in the sense of long distance traffic handling, but the general average was well maintained. Traffic honors go to 2BE, he heading the rather weak list this month. 2FO and 2AX are two of the most enthusiastic key-men of late, the latter's signals being reported in Australia and has recently worked Mexico. 2FO has been QSO in Porto Rico and generally is reaching out better and more often. 2AX is made an O.R.S. 2CI at St. Therese keeps that section's ears open on 150 meters while every other O.R.S. is working on 125 and 80. 2FI and 2CG have done some experimenting on 40 meters and have been steadily QSO Halifax and Toronto in brilliant noon daylight, using one U.V.201A only. They advise the boys from their experiences down on 40 meters that the results are not less than unbelievable. Halifax and Toronto stations quite inaudible in bright sunshine on 80 meters are genuinely strong on 40. 2BG and 2BN are not on so frequently of late, due to business pressure. 2HV, 2CN, 2CT and 2BV are all pushing out and taking in the messages that fly around the Montreal district, and the same may be said of 2AM and 2AV. 2DN is heard at times working merrily along, but does not give any report. 2CT has worked the West Coast, and 2AZ has recently worked both British Columbia and France.

Preparations are in full swing for a grand initiation of those eligible into the now well known ROTAB's.

Ex. G2NB, now in Montreal, is building a station so that he may be again QSO the homeland; happy idea, O.M.; here's luck to you. Ex. C9BL is building a good station in La Gabelle, P.Q. with call 2FT—we welcome him to the Quebec Division.

There are some very pleasing rumors around of an honest-to-goodness he-station of 100 watts opening up in Quebec City. Glory be! We've wishes for that for three years. Some day we'll have a station in Three Rivers too, then stamps will be saved by dozens!

Traffic: 2BE, 43; 2CI, 23; 2AZ, 7; 2BN, 18; 2CG, 15; 2FI, 10; 2AU, 15; 2AM, 33.

VANCOUVER DIVISION

A. J. Ober, Mgr.

Traffic has skidded a great deal with no regular routes going. Most stations are scattered between 80 and 180 meters and all the old stations seem to have left the air or ducked down in the swim of the QRM mill. Let's make 125 meters a traffic wave and start some messages going across Canada. Our battling order will be in these pages again so we will have something to hit at. The D.M. Relay is still going good but have not been able to hook the west coast direct with the east coast.

VANCOUVER—The Vancouver gang has had the best winter in radio that it ever had. "High Tension" Libby of 5BA, came down to short waves and after connecting with almost every district, connected with the New Zealand gang on four occasions and with Australian 2DS once. 5GO also connected once with New Zealand. (FB, OM's I hope it continues—D.S.) 5BA handled 23 mags. 5BZ has been blowing tubes almost as fast as he can buy them, but managed to handle 7 mags. 5AN is also kicking about "rotten" traffic—he says why the "Sam Hill" don't the gang rustle some messages and start them, and there would be no more QRURING. He handled 9 messages. 5BJ was laid up in bed for over a week and that knocked his traffic total on

the head. 6 Mags was the count. The 5DS and 5CU combination, a new O.R.S., takes the cake this month for traffic handled, a total of 43 messages. That's very FB, OM's! 5HS says there is more traffic on short waves than on the longer waves. (This seems to be an up and down question with all stations—D.S.) After going down on short waves 5HS's fiver went "West". "Me thinketh this short wave business be very prolific for the manufacturers". 5HS handled 10 mags—he got stuck with 6 which he had to mail. Hi! 5GF handled 19 messages. So far, he and 5GO are the only ones who can work reliably on 125 meters for the Trans-Canada Relay Route. This is an excellent channel for routing messages to the east every Wednesday night, and should be more patronized.

ALBERTA—4CW has sold out and it looks like he means it this time. 4GT has dropped to short waves but did not have a good report. He has a regular "He" pole up now and a 250 watter and sure raises "Cane" when nobody else is "Able." 4AX is not on the short waves yet, but says he is reaching out in great shape when he is able to be on. 4IO is the star station of the month! He seems to know where to find all messages. He hands in a total of 26 which is FB. 4AB is putting in some chokes to overcome the key-click, and will be on soon. 4DQ is using just one 75 ft. pole now and has dropped to 80 meters.

EDMONTON—4HF is still plugging for new stations. 4JF is on the air but has a very poor location and has not handled much traffic. 4AH is on the air again. He is improving his QSB with a new rectifier. 4HF is on the air with 50 watts and reports messages are few and far between. He is trying out the short waves—message total, 4.

VANCOUVER ISLAND—Very little traffic is moving. 5CT has worked through to C2AZ on 125 meters. (This is real DX, make it just one stride further to CIDD, OM, then you've done it—D.M.) 5AY is not on much; too busy at present but will make up for lost time. 5BL is on with 5 watter and dynamotor, and is QSO U.S. 6's and 7's. 5HK is having receiver QRM—can't perk below 200 meters.

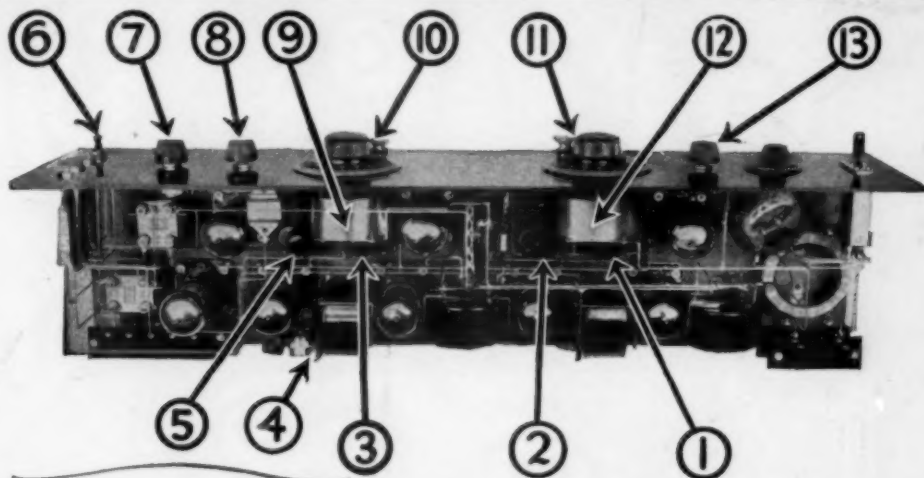
WINNIPEG DIVISION

J. E. Brickett, Mgr.

PRINCE ALBERT—4FA is now using pure D.C. (90 volts) on a 201A (Low power with a vengeance, eh, what.—D.M.) 4AV is getting out with a telefunken 30 watter, and works U. S. in daylight. 4FC is still juggling masts. He's lost count of the number he has raised but says he is going to make one stick up some day.

REGINA—4FV is the only active station here but he is on the air consistently and reports logging 2ZAC-Z4AG and Z4AK (I believe he is the first 4th district station to log a "Z". (FB, OM—DM) 4FV is willing to test with any one at most any time, day or night, on schedule. 4CB is on the air again. Hurray! and is ordering 100' of copper tubing for his new aerial. Business has kept him off the air lately. 4HH has been very sick and is just getting about again. He hopes the gang will excuse the absence of last month's report for that reason. He has reconstructed his aerial again for short waves but the transmitter seems to be ailing now and has not any pep, but managed to assist on the Wednesday night Can. Div. Mgr's Relay. Business has kept 4ER from his radio. 4AO is busy lining up new B. C. L's and coupled with frequent late hours (?) has kept his set silent. 4BB is raising a dust with 5 watts raw AC on the plate. 4GH is on the air regularly and QSO in every direction and has been doing some fine work. 4AQ will be on the air soon, having just got his license. 4DE is about to hit the air with a ½ K. W. Marconi tube, but has had a "mit" full of trouble dealing with a very peculiar proposition which has arisen in Manitoba sponsored by the Manitoba Government Telephone Co. The Winnipeg gang on the whole have been at a standstill. 4GK has been keeping up his end but the B.C.L's have been busy chopping down the end of his aerial and making things generally unpleasant (stick up lone one on top of the house, OM, then build a barbed wire entanglement around the house, that'll stop 'em—D.M.) 4AV has the honors on messages handled this month.

Traffic: 4AV, 28; 4HH, 21; 4FA, 20; 4FV, 17; 4FC, 10.

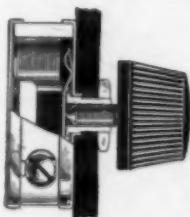


The Bradleystat is smaller than the UV-199 or C-399 tubes. It is much smaller than the 6-volt tube.



Graphite Discs provide smooth control

Observe the compact construction of the Bradleystat, shown below. Note the two columns of graphite discs, the pressure screw and the internal switch. Only two terminals, and yet the range is from approximately $\frac{1}{4}$ ohm to 100 ohms. The entire range is stepless and noiseless.



Bradleystat

PERFECT FILAMENT CONTROL

For All Sets and Tubes

The new Bradleystat has taken the radio world by storm. Thousands of radio fans have replaced their old wire rheostats, even in ready-built sets, with Bradleystats to get noiseless, stepless control, so essential in every radio set. The new Bradleystat is so compact, and the "one-hole" mounting so simple and convenient, that it is but a moment's work to install the new unit. Furthermore, a Bradleystat-equipped set can use any tube without change of rheostats or connections.

The super-heterodyne receiver, shown above, is equipped with Bradleystats at 1, 2, 3, 5, 8, and 13. Within the set, they are mounted on the baseboard; the others are on the panel. A Bradleyleak is used at 4, a Bradleyswitch at 6, and a Bradleyometer at 7. Bradleydensers are used at 9 and 12, and micrometer dial control is obtained with Bradleyniers at 10 and 11. This Allen-Bradley-equipped set is typical of thousands of multi-tube sets using the new Allen-Bradley line for maximum efficiency. Build for better radio by following this example.

Allen-Bradley Co.

Electric Controlling Apparatus

277 Greenfield Ave.

Milwaukee - Wisconsin

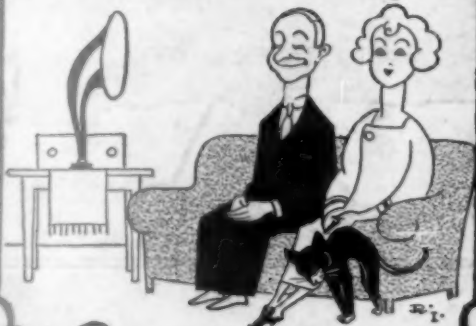
Mfrs. of Graphite disc rheostats for over 20 years

ALLEN-BRADLEY CO.
277 Greenfield Ave., Milwaukee, Wis.

Please send me the latest literature, describing the entire Allen-Bradley line of superior radio devices.

Name

Address



No set is better than its Loudspeaker

The one big thing in radio is *tone*. If you are listening to music, you want the tone so exact that it carries over the very personality of the artist. If you are listening to speech, you want the human voice—not a “radio voice.” If you haven’t heard a Radiola Loudspeaker, you may not know how clear it can be.

Try a Radiola Loudspeaker on your set and you will get the finest tone the set can produce—as clear as on a fine pair of headphones, but thrown out into the room in full volume for the whole family to enjoy.

Radiola

REG. U. S. PAT. OFF.

LOUDSPEAKER



*This symbol
of quality is
your protec-
tion.*



**RADIO CORPORATION
OF AMERICA**

Sales Offices:

233 Broadway, New York
10 So. La Salle St., Chicago, Ill.
28 Geary St., San Francisco, Cal.